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STUDIES IN BIOGRAPHICAL PSYCHOLOGY

ELSE FRENKEL
University of Vienna

I. Introduction

Within the past few years there has been developed in Vienna, under the leadership of Professor Charlotte Bühler, a type of empirical research to determine what general principles hold for the human life-span.[1]

It is common knowledge that human beings show in general the same type of biological development. The periods of growth, of maturity, and of decay have been found similar in all persons. It would be surprising if these biologically differentiated periods could not also be characterized psychologically; that is, if it were not possible to observe similar types of attitudes towards life, and similar types of subjective experience, as well as similarities in accomplishment and work, in persons who were in the same general period of life. An interest of this particular kind is directed toward investigating not individual differences, as studies in personality types would do, but, on the contrary, those traits which individuals of a certain maturity level have in common. The positive results of corresponding studies in child and adolescent psychology gave us further support for the belief that *general rules* for mental development could be found also in adults. Thus as complete pictures as possible of developmental phases of human life and its critical turning points have been worked out on an empirical basis.

In order to study our problem it was necessary to become closely acquainted with a great number of life-stories and to compare these

[1] The results to be described in this article are reported and discussed in detail in Charlotte Bühler's comprehensive book, *Der menschliche Lebenslauf als psychologisches Problem* (Leipzig, 1933), and in the more special investigations made before and after the book was published, under the direction of Dr. Charlotte Bühler and Dr. Else Frenkel at the Psychological Institute of the University of Vienna. The present article was translated from the German by Dr. Annette Herzman.

lives with one another. In the past few years in Vienna around four hundred biographies of individuals from various nations, social classes, and vocations have been critically studied. Wherever it was possible, letters, diaries, and other documents were also utilized for the purpose of control and also to secure additional information. Furthermore, in order to secure data on living people, of whom no biographies were obtainable, a method of direct questioning *(Anamnese)*, similar to that used in clinical interviews, was introduced. With the help of this method, it became possible to obtain data also on the lives of the working classes, since interviewers went to old peoples' homes, to the poor, and out into the country.

Through these methods, the research material was able to cover the lives of engineers and physicians, politicians and actors, business men and industrial magnates, artists and scientists, lawyers and journalists, priests and nuns, officers and soldiers, pilots and mountain climbers, teachers, workers, waiters, farmers, clerks, servants, janitors, etc. The material includes both men and women, and also persons without vocation or employment.

The life-stories were individually analyzed and compared with one another with the help of statistics. In this way an *inventory* was obtained of everything which happened, or was experienced inwardly, or accomplished in the various periods of life. The results revealed rather sharply demarcated *phases* through which every person passed in the course of his life. Each of these phases is characterized by a set of concrete traits which seem to point to a fundamental tendency common to each phase.

There are three groups of data which were collected in as exact and detailed a manner as possible.

(1) The first type is the *external events* of life, everything that a person does, his behavior. Among them, the different fields of activity in which the individual takes an active part are called the *dimensions* of behavior. For instance, practical dimensions would be such as one's study, profession or creations; social dimensions: one's family, friends, or help for others, but also playing cards, etc.; furthermore, sport, travel, hobbies, religious activity, etc., constitute other dimensions. It was possible through our material to set up an approximately complete list of the important activities. We distinguished in all ninety-seven such dimensions. We were particularly interested in dividing these activities according to age.

(2) The second group of data collected was the *internal reactions* to these events. It is important to know what the individual thinks about his own life. We tried to gather material therefore from letters, diaries, and autobiographical notes, or through direct questioning about these "subjective data." For instance, do the individuals write or tell us that their fate is a happy or an unhappy one (that they have already found the right vocation, their goal in life), or do they mention what they believe to be their wishes and their duties, etc.? All such utterances were also systematically collected and their distribution over the whole course of life was studied.

(3) Besides observing the objective behavior and the subjective experiences, we can also study, thirdly, the relation of the course of life to its objective results; namely, the *accomplishments and productions* (*Leistungen und Werke*) of man. We gathered material therefore on creative work, its effect on others, and its success, in the individual cases. Besides analyzing this subject-matter qualitatively, we were able also to present this material statistically and graphically. We studied the distribution of the various types of accomplishment according to quality, as well as amount, and obtained in this way the periods in which the various vocations were practiced with the most constructive and productive results. In order to obtain this quantitative material we counted, e.g., the number and distribution of operas or of novels which someone composed or wrote; or the number and distribution of inventions of engineers, or the number of times an actor played on the stage, the operations of a surgeon, the discussions and speeches of a politician, the records of a sportsman, or the number of ascents of a mountain climber, and so forth. In order to measure the quality of a piece of work or a performance, we investigated the effect this work had upon society. In other words, the various types of success enjoyed were determined and these results treated statistically.

The aim of this investigation, then, was to describe with the help of the above data the psychological development of human beings, and to attempt to determine the regularity with which the various periods of life succeed one another in this development.

In presenting the results obtained, we will begin with a description of the biological development because a consideration of these facts was instrumental in giving rise to this study, and because these

facts through their exactness and clarity are particularly well suited to serve as a basis for the psychological material.

II. The General Biological Curve of Life

In summarizing all the data gathered by the biologists with respect to the biological development, we find at first a period of progressive growth, in which the new formations in our bodies outnumber the decrements. This period, according to biologists (Weissenberg), lasts on the average until the twenty-fifth year of life. In the second period, called the period of stable growth, those injurious changes which cannot be repaired are still being compensated by new growths. This period lasts until the forty-fifth year. Around the forty-fifth year of life, symptoms of decline can be observed, and with these signs, the third period, called the period of regressive growth is ushered in. The regeneration of cells is stopped, whereas the injurious changes in the body are increased. One speaks in this period of a restriction tendency, because a decrease in the efficiency of the organism and the inability to repair injurious formations sets in. We find, therefore, a division of the life-course into three parts, from the standpoint of the growth process.

Some biologists also divide the biological development into periods from another point of view, namely, that of reproduction. In this way another division into three parts is obtained, marked off by the acquisition, the possession, and the loss of the reproductive ability.

Let us combine both of these points of view in our consideration of the biological development. The period of progressive growth is divided into two parts through the acquisition of the ability to reproduce around the fifteenth year of life. In the same way the period of restriction or regressive growth is cut in two, through the loss of the reproductive ability at fifty-five (which is the average for men and women). Thus *five biological periods* are formed, all of them marked off by a principal change in direction, such as an important acquisition or loss. The third and middle period, lasting roughly from twenty-five to forty-five, could be represented schematically by a horizontal line, surrounded symmetrically by the periods of ascent (first and second phase) and descent (fourth and fifth phase) of the "biological curve" of life.

It can now be explained what is understood by the concept *phase*. A phase is not characterized by processes which periodically return (such processes are found very often in biology), but rather by incisive and permanent changes in the development which only occur a single time during the process of life.

III. The Behavior Pattern during the Different Phases of Life

Biologically, it is possible to speak of the process of life in terms of rise and decline, ascent and descent. Can we also observe in the distribution of the psychological data a regularity, certain characteristics common to all? Can we find a parallel here to the biological structure? The results show that the changes in the abundance of activity (dimensions) and its distribution are phenomena corresponding to growth and decay. In order to show this it was necessary to use a method of presentation of the material which would allow us to survey the whole behavior of the individual during the course of his life. Since a great deal happened in a person's life we had to summarize in a graphic presentation all the facts about one person, as it is seen in the following sketch, Figure I.

The diagram shows the life of the mother of Goethe. Up to a certain point we can observe that new spheres and new fields of activ-

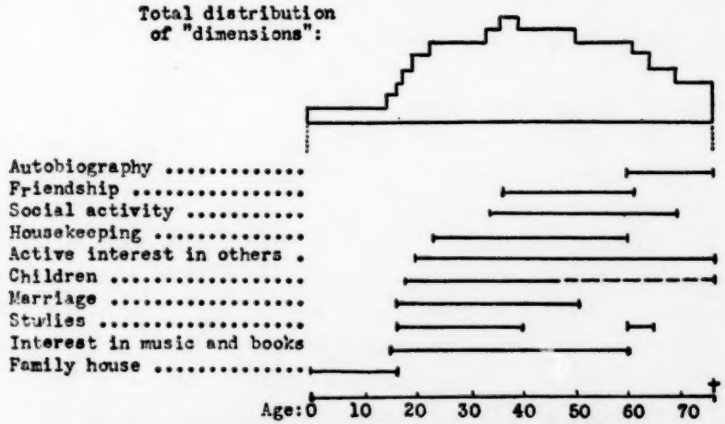

FIGURE I. Life of Elizabeth Textor-Goethe (1731-1808) (Data from Susanne Fischer)[3]

[3] Susanne Fischer, *Die Dimensionen des Behavior und ihre Verteilung* (in preparation).

ity are added. In all fields of life, expansion, ascent and increase, can be noticed. The period in the middle of life, called the culmination period, includes the largest and most complete number of dimensions. In this period we find stability also, since losses are replaced by new acquisitions. Beginning with a certain age (around the fiftieth year), certain activities are given up and external losses, such as a case of death, are not compensated for any more. One can observe a decline, a form of retirement from life. If we at first only take those data which relate to the behavior of the individual and present them graphically, we will find here also the ascent and descent in the curve, as it is clearly shown in the upper part of Figure I. It should be emphasized that other lives, even those of simple working men, would show a very similar general distribution.

Furthermore, we are again able to differentiate *five periods*. The first period is the one in which the child lives at home, and in which his life centers around a narrow group of interests, school and family.

A second period begins between the sixteenth and twentieth year (the average for the cases studied is around seventeen years). The turning point (most of the time quite sharply defined) is characterized by the entrance into a self-chosen and independent activity (in 78.5% of our 140 cases[3]) and by the first independently acquired personal relations (32%). Frequently the turning point can be placed at the time when the youth leaves the home of his family. We find in this period a building up of new activities, an "expansion" of the dimensions. But all the activities in this period (which lasts until the twenty-eighth year of age on the average) are of *preparatory character*. In only 21.5% of the 140 cases an activity chosen at the beginning of the second period is definitive for life. Certain "unspecific" activities are chosen, such as literary, philosophical, artistic, and religious interests, further study, and also the tendency toward loneliness and daydreaming. The motor activities which are expressed in wanderlust and sport are also very strongly represented. Many personal relations are acquired at this time, but they are usually only temporary. Within the limits of our material sexual relations begun by men before their twenty-eighth year last considerably less long (9.8 years on the average) than

[3] Else Frenkel and Gertrude Kral, *Das Problem des Phasenaufbaues im menschlichen Leben* (Vienna, in preparation).

those begun after the twenty-eighth year (29.8 years on the average).

The third period begins between the twenty-sixth and the thirtieth years of life (the mean is 28.6 years). Paralleling the corresponding biological period, this sector of life includes the *largest number of dimensions.* A great deal happens at the beginning of the third phase, just as was noted at the beginning of the second, so that its entrance is clearly defined. It begins in most cases with the final and *definite choice* of vocation (in 69% of our 140 cases studied) and, furthermore, with the choice of a definite personal tie together with the establishment of a home (52.5%). This phase (which lasts until approximately fifty years of age) is the *culmination period* of life. It is representative as the most fruitful period in professional and creative work. The social activities reach their high point also, since this is the time of the most numerous personal relations, and the greatest amount of social intercourse. Motor dimensions are represented in the form of travel for professional and personal reasons.

The average beginning of the fourth phase is 48.5 years. The criteria which were decisive in characterizing the first three phases were those which applied to the building up of life, whereas a decrease in the amount of activities and the appearance of "negative dimensions" (such as sickness, loss of associates, etc.) ushers in the fourth and fifth phases, and are the characteristic signs which announce the turning point toward the new period. Cases of death (of relatives and friends) which had less effect in the earlier periods because they were compensated through new acquisitions, acquire now a great deal of importance for the individual (in 34.5% of our cases). Individuals are also strongly affected by other losses of personal or economical nature, or damage to their bodily strength (in 41.1% of our cases such losses were decisive). Furthermore, at this time a change in the type of work is noted, especially in those cases where vital activities (sport, physical labor, etc.) are concerned. The actor becomes a director, the athlete becomes a trainer, the sailor a writer, and so on. In 21.5% of the 140 cases studied we find a complete retirement from work around fifty years of age. The transition to the fourth phase is marked by psychological crises, just as in the biological development crises also appear at this time (menopause). This will be clearly shown in the treatment of the

data on subjective experience. But we can also see here the tendency to change, discontent, and complete negation, as shown objectively through certain events. We find, for instance, the most frequent occurrence of trips taken for rest or recuperation between the ages of forty-five and forty-eight, with a decrease lasting until the age of sixty. This can be looked upon as renewal of unrest, showing itself in an intensified wanderlust, and a frequent change of residence. In the short time between the forty-fifth and forty-eighth years there is further a transitory inclination toward daydreaming and loneliness to be found. Unspecific activities, such as literary interests, a tendency toward retrospection, which otherwise first appear at sixty years, are also to be noticed here as a transitory condition. A high point in the destruction of one's own creative work (according to S. Fischer in about 40% of her fifty cases of creative individuals) is to be found at the beginning of this period. These objective data show us the crisis which takes place at this time, and which we will mention again later. This phase brings with it also a decrease in the number of dimensions, a restriction. However, the factual dimensions, such as the specific activity in one's profession or creative work, are still comparatively numerous. In particular, everything which is related to independent creative work very often first reaches its culmination point in this period. The social activities are shifted somewhat into a new field, since, although the general sociability lessens, the more philanthropic activities begin first at this time. In respect to the motor dimensions, a decrease in participation in sport and an increase in country life are noted.

The decline which we noted in the fourth phase, mostly in connection with the vital processes, becomes much more evident with the beginning of the fifth phase. The average age at which this phase starts is 63.8 years, based again upon the 140 cases studied by Frenkel and Kral. The fifth phase is often introduced by complete retirement from one's profession and from any sort of work in 64.5% of our cases. Sickness constitutes the turning point in 44.5% of the cases, death among close associates in 33% of the cases. Very obvious in this phase is the great decrease in the factual and social dimensions, whereas hobbies, such as collecting stamps, love of animals and flowers, etc., increase in frequency. Retrospection, the writing of memoirs, and the death cult are all very characteristic of this period. Furthermore, the occupation with politics,

studying a subject out of interest, and other unspecific activities, as well as the making of various plans, can again be observed. This seems to show a certain similarity to the second phase, a repetition of certain youthful traits. The social dimensions which one finds in this period are various types of active helpfulness, advice, consolation, etc. A strong preference for country life can also be observed. Analogous to the first phase, which seems to stand on the periphery of life but not yet taking place in it, the fifth phase finds the individual more or less "after" life, in that he has loosened the ties, has given up the plan of life which he had built up for himself.

Our results have shown that just as in the biological structure, the psychological structure of the course of life can be divided into phases which are clearly marked off from one another through certain turning points in life. These turning points usher in, in very short time, parallel and permanent changes in many fields of life, all of which allow us to imply that a basic transposition takes place. During the course of each phase one finds in general only a further development of that which was laid out at the beginning of the given phase.

The following data, taken from Frenkel and Kral,[4] give further evidence that the turning points can be considered more or less as distinct junctions in the course of life. The transition from the first to the second phase is for the average person marked by changes in two fields of life, whereas during the second phase (the average length of which is about eleven years) changes take place in only one field. On the average, 2.4 of the fields of activity per person change in the transition from the second to the third phase—i.e., within the relatively short period of about one year or even less—since the most important events happen at this time. However, during the whole third phase, the mean length of which is 20.3 years, changes are observed in only 1.1 of the fields of life. At the transition from the third to the fourth phase changes take place in 2.3 of the fields. However, within the fourth phase, which lasts on the average 17.6 years, changes are noted in only 0.3 fields.

IV. The Behavioral Pattern as Related to the Biological Curve

If we wish to characterize in summary form the five phases which we obtained from the data concerning human behavior and

[4] *Ibid.*

its changes, we can say that first a constructive and then a reductive tendency is effective in regard to the dimensions. The culmination point occurs in the middle of life and there is a parallel distribution to that found in the biological curve. In addition to this similarity, we also find, however, a deviation from the biological curve, and this latter is of great importance for our further considerations. If we notice the ages at which the respective phases begin, we will see that the phases of the biographical curve *are retarded in comparison to the biological.* We are therefore forced to suppose that some factor is present in the psychological development which influences this deviation and which is independent of the biological function in the narrowest sense of the term.

For this purpose let us consider, first, two complex fields of activity, which more easily correlate with the biological curve; that is, athletics and physical labor.

The culmination point for all sorts of *athletic activity* is found within the age boundaries of the biological ascent and culmination periods. However, with the help of a large amount of statistical material on sport, collected by F. Sack,[5] it was possible to establish several interesting differences among the various types of athletics. All types of sport in which skill, quickness, sharp senses, and sudden display of strength play the decisive rôles have an early culmination point. For instance, in the list of candidates for the Olympic games, the average age for boxers was 21.9 years, for throwing rings, 22.3 years. On the other hand, those types of sport which necessitate experience, a rational distribution of one's strength, endurance, and organization, culminate later. So we find the average age of the Olympic candidates for tennis, 28.3 years, and the winners of the Olympic for polo and prize riding range in age up to fifty years.

Figure II shows the distribution of sixty-two records. Curve I represents those types of sport, in which nothing but the own body's activity is involved, curve II those, which require the use of an instrument or a tool (e.g., ride a bicycle), and curve III those "passive" types of sport, in which the essential effort consists merely in governing a machine or an animal (e.g., to ride, or to drive a car). This latter case shows the latest culmination point, but even there the age limit of the biological culmination period (forty-five years) is far from being reached.

[5] Frieda Sack, *Sportliche Leistung und Lebensalter* (in preparation).

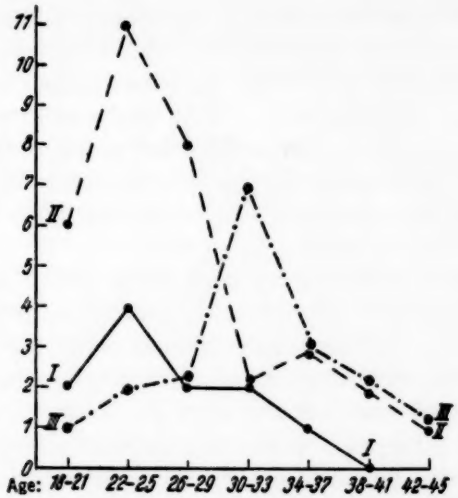

FIGURE II. Distribution of records in sports of different kind (According to F. Sack, from Ch. Bühler)

It is also found in *physical labor* that experience compensates when endurance is no longer at its highest point. When employers, themselves distributed over all age periods, were questioned, they stated that certain positive qualities of workers begin first in later years.[6] The older workers show the influence of growing experience, a greater familiarity with their tasks, mental stability, and more uniformity in their work. Personal affairs do not divert the older worker as much from his tasks; he is in general more disciplined, more practical, and easier to get along with. Older workers also have a great deal more love for their work.

Therefore, the results of large statistical material show that older workers (out of about 1,500 cases 83% were over thirty years of age) are preferred for those tasks which demand responsibility, personal decision, and material risks. As examples, the modeller or cutter in a shoe factory may be mentioned, or the mechanic who has to repair the machinery.

We see, therefore, that in both cases, that of the athlete and that of the worker, younger individuals are more successful in those activities which demand physical strength above all, and that the older individuals are more successful in work which demands endurance, independent thought, and responsibility. These results

[6] This study was made by Gertrud Wagner.

were substantiated by the results of psychotechnical tests (tests for mechanical ability, etc.), which showed that experience compensated for decreasing physical capabilities for some number of years. This was even true of physical labor. This compensatory factor is exhausted, however, by a worker at fifty-five years of age. Although the type of work accomplished by a fifty-five-year-old worker is not much inferior to that of a thirty-year-old, then his ability decreases rapidly.

If we compare these results with those found concerning the *intellectual professions* (taken from German statistics published by Fritz Giese), we see that persons first enter public life at twenty-five years of age (the beginning of the culmination period for vital—physical—activities) and retire at sixty-five to seventy years. It is therefore clear that certain mental occupations are to a certain degree independent of physical vitality. To that degree in which the mental, and not the physical, activities are the determining ones in the life of an individual, to that degree we find the restriction of life postponed and the expansion prolonged.

In summary, it can be said: The ability to give the most capable performance in athletics culminates at the same time as the corresponding biological high point, whereas in the manual worker the culmination point is retarded ten years, and in the mental worker still another ten years. We find, therefore, that there are a number of functions—we may call them the vital functions—which are correlated with the biological curve, and, furthermore, a number of psychological functions, such as knowledge, experience, training, which, because they help toward a rise in capability, counteract the biological decline.

The psychological functions are subject to another set of laws, and are therefore responsible for the deviation of the biographical curve from the biological. These factors will be analyzed still better when we bring the subjective data, the inner experiences, under consideration.

V. The Pattern of Subjective Experience in the Course of Life

In addition to the objective events and types of behavior, it is also important for us to study the subjective attitudes of people toward their lives. Let us now look over the data regarding these inner experiences, the utterances of people about their lives, and the

distribution of these utterances. It is important here also to obtain a graphical survey of these subjective experiences and their relation to age. This was done similarly to Figure I, showing the behavioral dimensions.

As an example, we will take the inner experiences of Wilhelm von Humboldt, a contemporary of Goethe and Schiller, as these were expressed in an extensive correspondence with his wife. This correspondence is representative of the large majority of available reports on inner experiences. The first statements made between Humboldt's twentieth and thirtieth years show clearly an irresoluteness and uncertain attitude towards life. It is not clear to him which direction he should take in life, nor does he look at anything he does or experiences in life as more than temporary. He has not as yet found an aim in life, and at first prepares himself for it in an unspecific manner: "Every fate which befalls me is only material on which I allow my soul to practise. My soul has now only a presentiment of so much, so much is first dawning upon it."

In this phase also go hand in hand utterances which point to the fact that Humboldt had the wish to experience a great deal, to meet new people, and to acquire education and culture: "I had a sort of passion to see many people, I made a special study of them." We can call this tendency in inner experience "expansion," since we find here also the desire to expand, to make contacts with the world.

In the statements made in the following phase (which begins around the twenty-eighth to the thirtieth year), Humboldt reports that he has progressed from a more preparatory and provisional attitude toward life to a certain definiteness and certainty; in short, he has found that path in life for which he was determined: "I have really acquired during this summer a great deal of certainty regarding my innermost convictions. I have found that which I have been longing for."

Around the forty-fifth to fiftieth year, we can again observe a change in his attitude toward life. Two new types of statements are now to be found. The one refers to physical or biological decline. Humboldt complains of fatigue, of the beginning of old age. It is necessary that he give up many of the fields of endeavor in which he had been active until then. We call these utterances "statements of restriction," since they point clearly to a breaking down of strength. In the same phase we find, secondly, that Hum-

boldt's accomplishments in life, his tasks, and the outcome of his life become very meaningful to him: "The question is, what comes out of all this in the end?" Finally, in the last period of his life (which begins around sixty) we see that in subjective experience, the occupation with the subjects of death and the end plays the important rôle.

When we consider Humboldt's subjective experience and, beyond this, that of all people, as has been done through the study of biographies and through interviews, we are able to differentiate two groups of experiences. The one is closely dependent upon and runs parallel to biological expansion and restriction. We find in the inner life of man, at first, the wish to learn to know a great deal, to try out a number of things, to expand; then, finally, mostly after much struggling, he finds it necessary to give up a great deal. His inner experiences are then of the sort which correspond to his weakened bodily condition, and which point to resignation and restriction.

We also find, however, a second group of experiences, which appear for the first time during adolescence. The young person asks himself for the first time, although in a quite theoretical form, for what purpose he should live at all, or what his design or calling or *"objective"* in life *(Bestimmung)* should be. Actually every person does not only wish to live and exist, but he wishes to have some reason for existing. This reason can be another person, a thing (e.g., money or position), or an idea (e.g., religion or science).

This fact of "wishing to live for some purpose" was found not only in the biographical literature, i.e., through the study of famous men, but also in interviews—conducted by M. Andics[7] with 110 persons who were unsuccessful in their attempts to commit suicide. Most of these, chiefly from the working classes, explained: "Life had no meaning for me any more." This search for the meaning of —or one's purpose in—life seems to be something quite specifically human. The feeling of one's own purpose in life develops step by step. Since the question is first raised during adolescence, we can call this the first step out into life, because in connection with this question the young person begins making decisions about his vocation and his future life. Still, that does not mean that the "purpose" in life is conclusively found at this time. The young person has been given a preliminary answer to his question and he has for the

[7] Margarete Andics, *Lebensprobleme von Lebensmüden* (in preparation).

first time made an independent decision about what he wishes to do or study, but we know that he will remain irresolute for a long time, and will make a definite decision as to his vocation and his partner in life only after any elapse of time. And, even if he has made his decisions sooner, these decisions are very often confirmed and accepted through inward conviction much later.

Soon the individual is not satisfied simply to know definitely how and for what purpose he is living. He desires now to turn out to "be" someone. This question as to what the results of one's life will be, now becomes very important.

When we now ask how these two groups of experience, the one corresponding to the vital functions, which we call "needs," and the other made up of our aims in life and their realization, are distributed over life, we observe an interesting alternation. In the first half of life, our subjective experience is determined primarily by our needs, in the sense of the expansion of the individual. On the contrary, in the second half of life, the individual regards as more important certain tasks which he has set for himself, or which have been set for him by society, or which have come from some code of values such as religion or science.

A special study, conducted by Frenkel and Weisskopf,[8] confirmed this result still further. Sixty-five subjects of different age levels, ranking from fifteen up to eighty years, were asked to name their concrete *wishes* and *duties,* and then to explain the meaning of these two concepts, wish (*Wunsch*) and duty (*Pflicht*). It was found that in the first periods of life the individual expresses a greater number of wishes, and later in life a greater number of duties. For instance, in the second phase (eighteen to thirty years) ten duties were named to every twenty wishes. On the other hand, we find in the fourth phase (from forty-five to sixty years of age) for every ten expressions of duties only ten expressions of wishes. At first both the wishes and the duties expressed refer to the person himself. Young people in the second phase of life wish, for instance, to be beautiful or to acquire a great deal of money or to be attractive, etc. Older people's wishes and duties find expression in things which lie somewhat distant from the person itself. For instance, they feel wishes for or duties toward the family, or toward realizing

[8] Else Frenkel and Edith Weisskopf, *Die Einstellung zu Wunsch und Pflicht im Laufe des Lebens* (Psychologische Forschungen über den Lebenslauf, edited by Ch. Bühler and E. Frenkel, Vol. I, Vienna: Gerold, 1937).

some certain social conditions or ideas, etc. In the second phase, for every ten objects mentioned which related to things in the outside world, there were found to be twenty-seven objects which were related to the individual himself, whereas in the third phase only thirteen of the latter to ten of the former, in the fourth phase 3.8, and in the fifth phase 2.3. We find in the second phase that 92% of all the wishes are directed toward the individual himself. The duties, whenever they are expressed at all, are very general in nature. On the contrary, in the fifth phase (beginning around sixty years of age) only 29% of all the wishes refer to the individual himself, whereas 32% to the family, 21% to "mankind in general," and 18% to objective ideas. In general, we can say that around forty-five years of age a change takes place in that the "needs," which come from the biological nature of man, become less important, and the duties directed by our ideals and our conscience, or laid down by authority and practical demands, play a more dominant rôle. In connection with this we find at the same time a change in the objects which are of relevancy in life. At first the individual himself plays the important rôle in his wishes and duties. Later, other more objective interests are placed in the foreground.

Deviations from this general law of development were found only in those subjects who were diagnosed by physicians as *neurotics*. In these cases the wishes strongly outweighed the duties, even in the third and fourth phase. Besides this, a greater percentage of the wishes are expressed for the individual, for instance, 90% in the case of a fifty-three-year-old woman. Another type of neurotic personality, the person with a compulsion neurosis, seems to be made up exclusively of duties. The character of these duties, however, corresponds to that of a much earlier phase of development of the individual, since they are of a very general nature out of which no concrete tasks are developed. Another outstanding characteristic of these neurotic personalities is that the subject-matter about which they talk falls into other spheres than does that of the normal person. For instance, some compulsion neurotics, whose emotional life is disturbed, place sexuality in the sphere of duties and not in the field of wishes, as a healthy person does. In this way the sphere of duty has taken over all those individual and social demands which otherwise are guaranteed their realization through the normal biological needs.

We may call the transference from the field of need to the field of duties, which is dictated by society and inner developmental factors, *transference in dominance (Dominanzwechsel)*. We should like to illustrate a few examples of this type of transference. The financier, Carnegie, in the first half of his life, founded one concern after another, always piling up more money, because of his own inward desire toward expansion. However, he began to ask himself one day later in life if there was any purpose in accumulating so much money, and he actually turned his attention toward spending his money for philanthropic purposes. In this way he fulfilled a duty; he found some value in the accumulation of a fortune. We find in another example the writer, Tolstoy, as a young man, influenced in his method of living almost entirely by his biological needs and desires. We meet him at first as an officer, enjoying a licentious existence and making only temporary ties. Whatever work he does during this time is not planned. At one time he is occupied with one thing, at another time with something else. In the third phase of his life he is still vitally interested in life itself, even though his life had already taken a definite course. He is married and lives on his estates, enjoying his bodily prowess in such activities as hunting and other outdoor life. In this period, also, he writes his great novels. However, one day, when he is fifty years old, he is overcome by a fit of depression. He finds life meaningless, it has lost its power to intoxicate him, and it is necessary for him to fight against a strong impulse to commit suicide. He himself stressed the fact that to the same degree that he earlier strove toward life and experience, in that degree he now strove away from life. He first found a meaning in life again through absorption in religion.

In such changes in dominance a developmental step in early childhood is now repeated, but on a higher level. When we say a child is ripe for school we mean he is capable of giving up the arbitrariness which a four-year-old still evinces, and he is willing to subordinate himself to the group and to accept and perform his tasks.

Still another developmental process which we have observed in the course of life is to be found in early childhood. During the school age the child acquires a maturity in the performance of his tasks; he can now utilize material in a "specific" way. For instance, when the small child is given some blocks, he hits them against his bed. He first begins to build things with these blocks in a later

stage of development. We then can say that he uses the material in an adequate way or in the manner for which it was "specified."

This development toward *specification* in the use of materials repeats itself again in the course of life. Namely, in the second phase we find a functional period of activity in mental as well as physical work. This activity is without a goal, being done only for the pleasure in doing it. It is only later that the transition is made to organized, practical, and planned work. Suitable interests are rarely found by the individual during the second phase of his life. For instance, Gottfried Keller believed himself destined to become a painter, and Liszt, a virtuoso. Later the work they were to do became specified, and Keller proved to be a writer and Liszt a composer. Other examples of a more gradual specification can be found in the lives of Queen Victoria of England and Maria Theresa of Austria. Victoria received an education fitting her for her future position, and at the beginning of her reign took over all the business of the government very energetically. Gradually, however, her husband and children became more important to her. She considered herself more and more destined to be a wife and mother; and therefore retired step by step from the affairs of the government, which she then left almost entirely to the care of her husband. The situation was just the opposite in the case of Maria Theresa, who was raised to be a housewife and a mother. She was prepared to allow her husband to be the directive force in the nation, when she started her reign. However, she began noticing his weaknesses and her own ability to rule, and so the leadership gradually passed into her hands.

Summarizing, we can say that in the transference of dominance (i.e., a change in stress from needs to duties) and in the gradual specification of interests, the finding of one's calling or objective in life, we have found two important developmental laws.

If, looking back, we consider the inner experiences of man and their arrangement in the course of life, we find that according to our material they are also divided into five phases.

The young person just passed through childhood—the first phase of life—makes the first plans about his life and his first decisions in adolescence or shortly afterwards. Here begins the second phase of experience. It is characterized first through the fact that the young person wishes to acquire contact with reality. He experi-

ments with people and professions. An "expansion" of his person takes place. Also characteristic for him is the temporary nature of his attitudes as to what his life calling will be.

A study, carried out by E. Dichter with fifty-three subjects,[9] dealing with self-criticism of the individual's abilities, which we should like to mention here, showed that the experimental subjects in the second phase of life still were not clear about a great many of their abilities. The average was fourteen abilities in the second phase, about which the individual was subjectively undecided, and in the fourth phase only five abilities. These facts show the tendency toward expansion, and also the uncertainty of this second phase. One does not know which traits can be, and which should be, trained. Chiefly those traits pertaining to character, the body, or social abilities, occupy the mind of the youth of this period.

First, at the end of the second phase (around the twenty-eighth year) the utterances show that the individuals have become clear as to their definite attitude toward life. As has been seen, during the third phase, vitality is still at its high point, while direction and specification are now also present, so that very often this time is found to be the culmination period for subjective experiences.

The transition to the fourth phase very often is introduced by a crisis, since at this point the unfolding of the individual powers has come to a standstill, and much has to be given up which depended upon physical aptitude or was connected with the biological needs. Contrary to the descent of the biological curve and the experiences which are connected with that, we find here an ascending scale by virtue of new interest in the results and productivity of life. If one asks a person in this phase to relate his abilities, he names very few of them and mostly those which are connected with his profession.

Finally, in the fifth phase we find more strongly mentioned age, premonitions of death, complaints of lonesomeness, and often those in this phase are occupied with religious questions. This last period contains experiences of a retrospective nature and considerations about the future, that is, about oncoming death and one's past life. The balance-sheet of life is drawn up, so to speak. This is expressed often through the writing of memoirs and autobiographies. This last phase of life has a certain parallelism queerly enough with the age of adolescence; on the one hand, the adolescent leaves the

[9] Ernst Dichter, "Selbstbeurteilung der eigenen Fähigkeiten," *Archiv für die gesamte Psychologie*, 1935, XCIII, 347-382.

life of childhood; on the other, he must make the transposition to his future life. The diary is used as a means of helping him clear up his problems in this period of transition.[9a]

However, not all types of experience are found to be present in every individual. For instance, in a few cases, only the vital functions have had an influence upon their lives, and therefore only one group of experiences is found. We are thinking in particular of Casanova, or of many women whose life has a short blooming period, and then is completely extinguished. Lives in which sexual experiences play the chief rôle and in which very little compensatory effects through more sublimated interests are present, and also no productions of any sort, work or children, show an unquestionable subjective decline in the second half of their lives. Physical efficiency is taken as the only measure for the building up or breaking down of their lives. Casanova said in his thirty-eighth year, "The beginning of my end began on this day." Still in most lives, the reduction in vitality is not experienced as a negative affair, since a change from a more physical to a more mental life takes place and the second half of life takes on a more positive form. The ability to transpose oneself, to take on another attitude toward life is a character-trait which is almost a necessity for success in life. For the psychology of development it is important that the individual both in personal and in practical fields not only satisfies his needs, but that he also at some time accepts certainties and tasks and works for them. We have analyzed some cases such as those of the courtesan Belle Livingstone and Beau Brummell, both of whose lives were shattered because they were built up around pleasure and the satisfaction of their desires. They had no ties, no interests, and had achieved no results in life which would outlast the decline of their physical strength.

VI. Creative Work and Other Products of Activity in the Course of Life

The expansion of one's life may also be prolonged, as we can observe in the prototype of production—procreation. In this sec-

[9a] Among the publications based upon studies of about a hundred original diaries collected by Ch. Bühler we shall mention here the following: Charlotte Bühler, *Jugendtagebuch und Lebenslauf*, Quellen und Studien zur Jugendkunde, No. 9, Jena: Fischer, 1932, and: *Drei Generationen im Tagebuch*, ibid., 11, 1934; Else Frenkel und andere: *Die Pubertät als Antizipation des Lebenslaufes*, Quellen und Studien zur Jugendkunde, No. 14, Jena: Fischer (in preparation).

tion we wish to consider the course and the distribution of productive activity in the life of human beings.

In order to compare the works of various individuals it was necessary to find a method of surveying the data quantitatively. But, for instance, the work of a composer is not made up of items of the same kind. It would be difficult to treat opera, songs, and symphonies as equivalent types of material. We did not attempt therefore to make a completely quantitative evaluation, but instead considered each type of work separately, added up, for instance, the amount of songs composed in one year and, separately, the amount of operas composed in the same year, etc. For each of these separate items, separate kinds of graphical representation were chosen, and they were placed over each other, on the same scale. In this way, a composite histogram was formed which shows how many works of each type were created in a certain period of time. We present one example from our collection of around one hundred and fifty analyses of productive activity in the various professions (Figure III).

If we record in this way the individual performances in the various vocations, four main types of distribution of creative works may be distinguished. In the first case (I) we find a left skewed curve, i.e., the quantitative culmination point occurring relatively early. In the second case (II) it appears in middle life, and then comes a descent in both cases. Both these curves are similar to the biological curve. In a third typical case (III) the mode of performance appears relatively late; i.e., in the second half of life, represented by a right skewed curve. Finally, in our fourth case (IV) an even distribution of productive work is found over the whole of life, graphically illustrated by a flat-topped curve. The last two cases appear to be much more independent of vitality and of the biological curve.

The question which interests us is whether a correlation between types of distribution of performance and type of vocation exists. It was noted that under distribution type I could be found primarily sportsmen or athletes, whose records were likewise computed by adding the specific items of performance, e.g., the number of times a mountain climber completed an ascent. Furthermore, this group contained a certain type of actors, especially those who only played lover's rôles; for instance, the singer, Jenny Lind, the actress, Charlotte Wolter, and others. In this case the distribution was formed

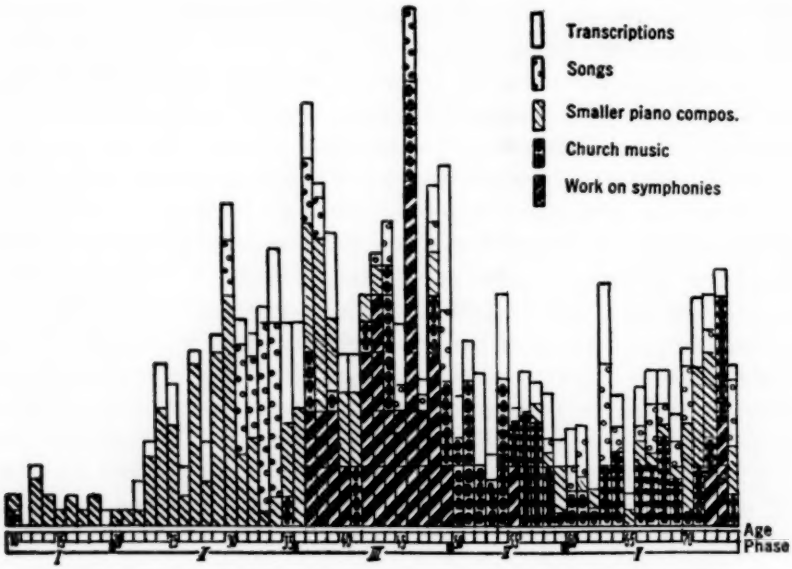

FIGURE III. Productive activity of Franz Liszt, composer (1811-1886)
(After R. Schramek, from Ch. Bühler)

(When the production of a symphonic work extended over several years this work is represented in the diagram more than once, according to the years seriously dedicated to its production. We may suppose that in those cases several rather independent creative impulses were required. The more time-consuming kinds of activity (e.g., symphonic production) are represented by heavier color and by two to four times as high areas as the smaller ones (e.g., songs).—The distribution of the total production of Liszt, as shown in the figure, follows type II of the distribution types characterized below.)

by adding the total number of performances or the number of appearances in a new rôle. Furthermore, several mathematicians and theoretical physicists, both of whose occupations are characterized by abstract systematization not requiring much experience of life, are found to belong to this type of early culmination of efficacy.

In distribution type II we find, for example, the business undertakings of Rockefeller, I. Fugger, Riccardo Gualino, and others. The inventions of Watt, Nobel, Edison, Max Eyth, etc., all accumulate around the middle of life, also the explorations of Nansen and Sven Hedin, the compositions of Liszt, Bruckner, Verdi, Löwe, and others, the paintings of Amerling, Feuerbach, Waldmüller, and the writings of Lessing, G. Hauptmann, etc.

Distribution type III shows the political accomplishments of Bismarck, Stresemann, Seipel, Cavour, Bebel, and others, also the

journalistic activity of Börne, Austerlitz, and the works of Leibniz, Kant, Hegel, and Humboldt.

The relation between a certain type of profession and a certain type of distribution of performance is in no case close, since to every relationship established, plenty of exceptions are found.

There are other actors than those cited above who change the type of rôle they play, and therefore the distribution of their performances is shown by distribution type IV. Such actors play lovers' rôles in the second phase, and character rôles in the fourth phase. In the third phase, experience on the one hand, and the life's vitality on the other, both combine to leave their effects, and therefore the individuality of the person is given free play, i.e., he can play either character or lovers' rôles. There are also artists, writers, and inventors, whose accomplishments are distributed evenly over the whole of their lives. It is, furthermore, true that not all philosophers write their main works in the fourth phase. Some of them are also produced in the second phase. In such a case, however, the work bears the character of the phase. Philosophical works written in the second phase—for example, those of Schopenhauer—are emotionally toned and bear the subjective imprint of the writer. At the same time they lack system and finish. The greater the systematic construction, the later it is usually created in the life of the specific individual.

More generally, we can say that the more vitality needed for the type of accomplishment, the earlier the culmination point for this work; whereas the more systematically integrated experience involved, the later the high point of production is reached. This applies to both the quantitative and qualitative culmination points.

Furthermore, certain fine points in the distribution of accomplishment can be observed, which indicate its division into phases. Just as in the material on events and inner experiences in life, we can find objective criteria in this latter subject-matter which mark off the turning points in life.

So, for example, in the accomplishment curves of the composer, Anton Bruckner, and the actress, Charlotte Wolter, indentations can be observed which correspond to changes in the *quantity* of accomplished work.

Furthermore, a change in attitude towards one's creations and in the quickness of construction can be noted, for instance, in Verdi's

case. He created very little in the second phase, and then not very original compositions. In the third phase he wrote twenty operas in twenty-seven years, but he endeavored to make them mostly of the type which would be effective theatrically. He wrote very few operas again in the fourth phase—one of them was *Aïda*—but these were written with a great deal of care and he took a long time to finish them. Finally, in the fifth phase, he produced a new type of opera, *Falstaff*, a comic opera. This *change in type* can likewise be used as a criterion of division into phases. For instance, in Liszt, we find first performance as a virtuoso, then symphonic creation, then oratorial creation, and finally in the last phase unspecific activity (see Figure V and also R. Schramek[10]). The change in phase can also be indicated by the change in vocation such as found in the engineer and writer, Popper-Lynkeus. After the second phase, in which he prepared himself through his studies, he displayed technical accomplishments in the third, and social-political activities in the fourth phase. In John D. Rockefeller, as well as in others, we also find a "change in type" of accomplishment.

We are, however, interested not only in the time when people do the most work in their various vocations, but also when they do their *best work*. We must look again for an objective measure in order to evaluate the works created. This can be found only in the opinions left by society about these works. All direct and indirect valuations were gathered together under the name of *success*. Now there are various types of success, and only when we take all these into consideration, can we obtain a complete evaluation of the specific work under consideration.

We were able to distinguish different types of success. The first is *public success*, or success in the eyes of the general public. We counted the number of performances of operas and plays of fifty composers and fifty writers, and in the case of another eighty poets and writers, the number of editions of their books. Furthermore, as far as it was possible, the attendance at the speeches of politicians was counted. On the basis of the past success, it might also be possible to make prognoses about the further success of an opera or a play. Our observations indicated a certain regularity in both writers and composers. A sharp rise in the curve of success at the beginning gives way to a more jagged course in the curve, and

[10] Rudolf Schramek, "Franz Liszt: eine lebenspsychologische Studie," *Archiv für die gesamte Psychologie*, 1934, XCII, 45-84.

is rarely followed by any permanent popularity. Conversely, little display of success at the beginning, followed by a gradual and uniform rise in the curve, goes hand in hand with a success of greater and more lasting effect. An example for the former type is given by the case of Leo Fall, operetta composer, who is at present almost forgotten, and to some extent also by the "classical" operetta composer Franz von Suppé (Figure IV). The latter type is represented, e.g., by Mozart among the composers, or by Gottfried Keller among the writers.

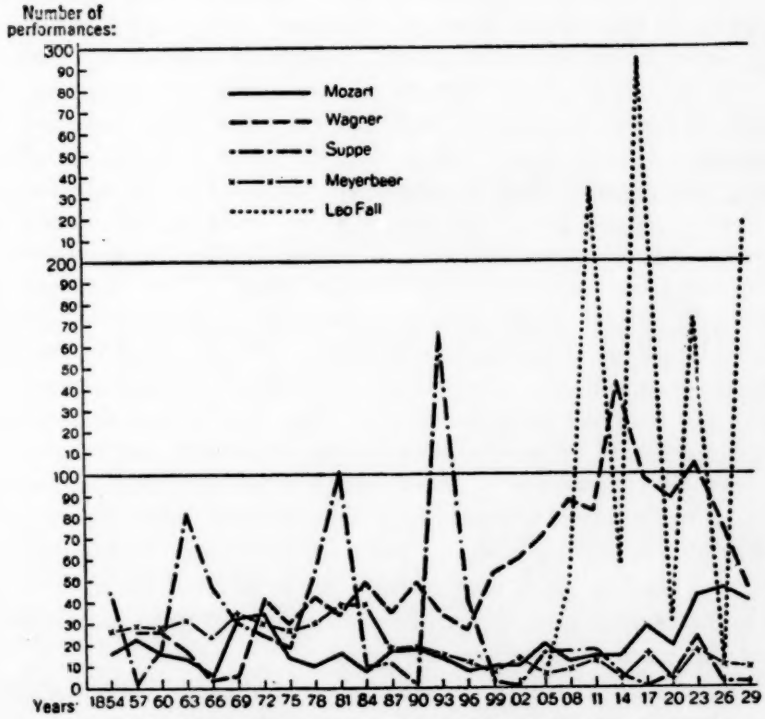
Number of performances:
Mozart
Wagner
Suppe
Meyerbeer
Leo Fall
Years
1854 57 60 63 66 69 72 75 78 81 84 87 90 93 96 99 02 05 08 11 14 17 20 23 26 29

FIGURE IV. Performances of operas and operettas of five composers in Vienna theaters from 1854-1929 (From E. Frenkel)[11]

As a second category of success, we attempted to determine the *monetary success.* We constructed curves of the monetary gains made by Rockefeller and others and also, for example, a curve of the income of Caruso. This type of curve frequently follows closely

[11] Else Frenkel, *Leistung und Erfolg: Biographische Untersuchung,* Bericht über den 12. deutschen Psychologenkongress in Hamburg (Jena, 1932), pp. 331-335.

all the variations in the course of performance. If Caruso sang especially well one evening, he was immediately offered contracts with higher salaries, and vice versa.

The third type of success which we differentiated is what we call *official success.* Under this group are placed all the distinctions received through official sources, such as the bestowal of titles or official positions as a mark of appreciation for the accomplishments of the individual, professorships, etc.

Fourthly, it is to be noted that a piece of work is also evaluated by a circle of experts in the specific field: *success among experts* can therefore be constructed from the criticisms, not from a one-sided point of view, but from the general opinion of most of the specialists in this field. For instance, we collected the criticisms of Goethe, made by specialists, both in newspapers and histories of literature. It was found that a shift in opinion had taken place among this group during the course of years. The contemporaries of Goethe judged his earlier works to be more valuable, such as *Werther* and *Götz von Berlichingen,* whereas today the works written in the later part of his life are preferred. This is shown in Figure V, where rank orders constructed according to judgments of leading representatives in literary critiques of different age periods are graphically comprehended. (Even the public success, which, for the most frequent type of cases, lags behind the success among specialists for several decades, has at present almost reached this level of appreciation.) Such a shift in esteem from an accent in youth to an accent in later life is characteristic for most creative workers of the highest rank. It indicates their later creations being of higher quality, since they hurried on in advance of their time to a higher degree than the earlier works did, and their success outlasted the success allotted to the latter.

Finally, as a fifth type of success, we studied the *self-criticism,* the evaluation which is given of a piece of work by the creator himself. We compared also the self-criticism with the criticism given by others.

The purpose of this analysis of success was to obtain some sort of exact measure which would help us to evaluate the social effect which a piece of work had received. In this way, from the reaction which it called forth among society, we could arrive at a conclusion as objective as possible about the quality or the value of this work.

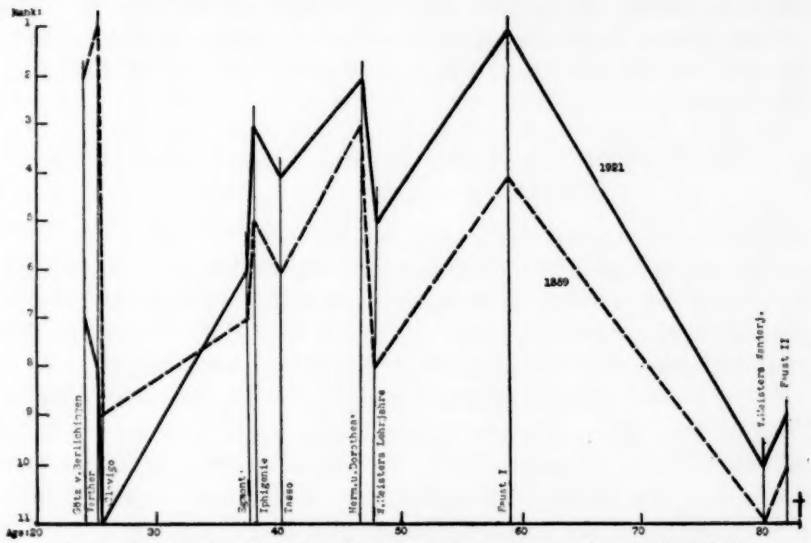

FIGURE V. Shift of Goethe's "success among experts," as indicated by critics about thirty and about ninety years after his death (The data collected by Maria Latka)

Also, the after-effects of success upon the further creative work and upon the life of an individual were thus examined.

* * *

In summarizing the foregoing sections, we can say: The first problem of these investigations was to determine what general developmental laws can be found running through a great variety of concrete data in the course of life. External events, subjective experience, and accomplishment are data which are found in all lives. We analyzed these data qualitatively, made as complete an inventory of it as possible, and determined its quantitative distribution. These psychological data can be arranged in the form of curves, which show a rise, a culmination point, and a descent, parallel to the biological curve, except that the psychological ones are more or less retarded.

A general law of development can be formulated in the following manner: In the development of a completed life five phases are passed through which can be characterized in detail. The single phases are quite sharply marked off by specific turning points. We find at first a building up of the psychical functions (first phase), then an active but *tentative* and *provisional* step out into life

(second phase), which later becomes *definitive* and *specific* (third phase), then a shift toward an interest in *certain results* is attained (fourth phase), and finally a *decay* and a *loosening of the ties of life* (fifth phase).

VII. Typological and Vocational Differences in the Structure of the Life-Course

As it was pointed out in our Introduction, the main interest in conducting the group of investigations reported did not lie in typological differences. Let us, however, now turn our attention from the general developmental process to a consideration of certain type modifications. We investigated the following problems:

(1) Do we find in different courses of life different distributions of the data? The inner experiences might play a very insignificant rôle in comparison with the events, or in comparison with the productive activity. Furthermore, within the realm of inner experience itself, the desire for expansion could be much greater or much less than the wish to find one's goal in life. In any one life creative work might constitute the main activity of the individual, or, just contrarywise, life as such might hold the greatest attraction. Also a life could have its culmination point earlier or later, depending upon whether it demanded more physical vitality or more mental ability (see Section IV).

(2) Variations are found in the (*chronological*) *age* in which developmental and maturity processes take place, and thus we find the phenomena of early, normal, and late maturity.

(3) Besides those lives which are more or less completed and come to a normal close, we can also observe so-called *incomplete* and *unfinished* life-courses. Incomplete are the lives in which certain categories are omitted. For instance, we have seen in the life of Belle Livingstone that she made no permanent ties and showed no productive accomplishment. Unfinished are the lives which break off before the end of the normal cycle of psychological phases is reached.

Not all shortened lives, however, are "unfinished." Many such lives are rounded off or finished; in such cases all the five phases are compressed within a shorter space of time. Characteristic for such *short lives (Kurzleben)*, investigated in a special study by Miscevic,[12] is the rapidity with which the phases are completed, and the early

[12] Sylvia v. Miscevic, *Kurzleben* (in preparation).

change in dominance; that is, the beginning of the breaking away from life and its demands arrives earlier. Furthermore, a quickness of production and an early completion of work or accomplishment are observed. Let us compare the accomplishment curve of Liszt (Figure III), who lived to be seventy-five years old, with that of the composer, Felix Mendelssohn, who died at thirty-eight and who furnishes a characteristic example of a short life among composers. Liszt reaches his maximum amount of productive activity between the forty-second and the fiftieth year of his life, Mendelssohn-Bartholdy at twenty. After reaching their respective culmination points both turn to religious compositions to a marked degree. And in the last few years of their lives both take up again the various types of production occurring during the former periods of life.

(4) Further, we have begun investigations of the variations in the structure of life in its relation to type of vocation.[13] The following are some examples of our results:

Artists are found to spend the shortest period of time in study, but they take the longest time for making their plans and preparations. Creative activity begins very early also, sometimes at fifteen years of age, and it lasts longer than their professional activity. Work in collaboration with others is rather seldom done. However, they display a strong tendency towards criticism and correction of their own creations, which is also partly influenced by the opinions of others. Motor activity is also found in this group to a great degree. It expresses itself in the form of a roaming existence (which usually lasts until forty-five years of age), also in the great number of trips taken, but less in sport. Old age brings with it a desire toward country life. Present to a great degree in this group is the tendency toward sociability, primarily for the purpose of innocent entertainment. The artists, as individualists, are less interested in organizations and political associations. The relations to women last seldom any length of time, and we find frequent marriages and a strong tendency toward adventure. The love life plays an important rôle in their experience. However, a feeling of responsibility toward the family, or a relationship to children, is not very strongly developed. Friendships very often take the form of a relationship between younger artists and some more mature one, and

[13] Susanne Fischer, *Die Dimensionen des Behavior und ihre Verteilung;* Paula Klein, *Lebensläufe von Philosophen;* Hedwig Kramer, *Studien über Politiker und Journalisten;* Grete Mahrer, *Lebensläufe von Schauspielern* (all in preparation).

then as a younger man matures, he slowly assumes the position of a leader. Active interest in the welfare of others begins very late in the life of an artist, and is in any case not very great. On the other hand, we find in the artist a strong religious feeling, which lasts throughout life, and also superstitious belief; autobiographical tendencies are frequent, but begin late in life. Also, a good deal of day-dreaming and a periodical tendency toward living in retirement are noticeable. The artists are primarily individualists. It is unfortunately not possible here to enter into a discussion of more detailed results, such, for example, as a separate study regarding the structure of the actors' profession.

Scientists spend a particularly long period of time in study, which often extends to a very mature age. Also the entrance into a profession and the beginning of creative work take place often after the twenty-fifth year, which is relatively late. However, the productive activity lasts a long time. Unspecific activity is marked only during youth and old age. Often the great systematic works of the scientists are not written until the second half of their lives, since at this time the necessary psychical preparation, mature experience, and concentrative ability are present. Motor activity, outside of an inclination toward country life and walks, is not found to any great degree. Traveling is done chiefly for professional purposes (congresses, etc.). Sociability does not play a great part in the life of the scientist, and is chiefly expressed by taking part in scientific societies and conventions. We find in their relationships to women that the scientists very often either remain bachelors or enter into permanent marriages. They show a great love for children, which is often expressed in the desire to have their children enter the same profession. A great amount of professional correspondence is written, and also vehement scientific battles are fought. Discussions of factual nature are very frequent during the whole of life. An inclination toward religiousness is rarely found; also, few diaries are kept. There is frequently a tendency toward leading a lonely existence. Artistic interests, chiefly music (less in literature and art), are very often pursued as hobbies. In general, we can say that the life of a scientist follows rather regularly a certain set pattern. Rather striking is the lateness with which stability in type of work is reached, and this brings with it a later development of social ties. Personal hobbies take up only a very small part of their time. We find very often, chiefly in the philosophers, a weak-

ened biological constitution, which does not seem to be an unfavorable condition for the necessary concentration. In spite of this the length of life is very great, a fact which probably is connected with the quiet life which is led.

The category, *men of action,* is comprised chiefly of politicians and business men. The period of vocational study for individuals in this group lasts longest of all, often until forty years of age Politicians very often have had previously other preparatory vocation, following which they begin to fight for some cause, and then still later productive and constructive activity sets in. In general, a frequent change in vocation is found in this group. Much time is spent in vocational activity, and therefore less creative work is done. Characteristic for the type of productive activity is that it is extremely often done in collaboration with others, particularly in old age. In general, the main constructive work is done first after the middle of life, and it continues until old age. We do not find much traveling for pleasurable or personal purposes, but many trips are made for business reasons; also few walks or excursions are taken, and, in general, little of a contemplative nature can be noted. However, this group takes part in sport, and enjoys physical exercise, e.g., in the country, on vacations. As to social contacts, those particularly are to be mentioned which are made for business purposes, such as business connections with individuals or with organizations. Attachment to the family and permanent marriages are noticeable. For these men the love life is less important and friendships also play a small rôle in their lives. However, quite an interest is shown in the welfare of others, expressed through help of all sorts, and monetary contributions. Professional arguments and a large correspondence are very frequent. An inclination toward religion is not very strong, and there is also no tendency to loneliness or daydreaming. Among their hobbies can be mentioned interest in art (literature in their youth, and art—particularly architecture—in old age) and interest in politics. Frequently found is a passion for collecting. These men of practical affairs are primarily concentrated on things of a factual nature; that is, their profession means more to them than any other part of their lives. Their lives do not always take a simple course. They embrace many fields of activity, and they are very versatile. Most of them have very sturdy organisms; otherwise, they would not be equal to the demands of their trying vocation. In spite of this, they die early on

the average, partly because of the other dangers of their profession, such as attempts on their lives, etc. These general characteristics were further substantiated through still more detailed studies of single personalities. For instance, in a study of Bismarck, done by Kollmann,[14] it could be shown that his political actions could be understood not only as arising from external conditions, but also from the viewpoint of developmental psychology.

We find in both professional and non-professional *women,* that the main accent of their lives is laid on social relationships. Even their profession to a great extent is looked upon as a means of enriching their lives socially. We find very often that the non-professional woman studies out of interest in, or takes part in the work of, persons close to her. The motor tendencies are chiefly represented in travels for health, for pleasure, or for visiting someone, and (in the case of professional women) for business reasons. The social life of woman, her main field of activity, is made up of social intercourse and sociability of every sort. Also friendship and family ties are very strongly developed. Women spend a great deal of time displaying active interest in others, e.g., by giving advice, consolation, care, help, as well as in co-operation in group activity. The greatest amount of this type of activity is carried on during the middle of life, the period of greatest activity, and not, such as we find in men, at the time of decline of factual and motor dimensions. A great deal of correspondence is also found, mostly of a personal nature. Not infrequent are personal quarrels, chiefly during the change of life between forty and fifty. The religious interest is quite strong and finds its expression especially toward the middle of life and during old age. A great deal of time is spent in reading, retrospection, and in the writing down of experiences. Artistic interests, music, literature, are very frequent. Also very noticeable is the preference for theater, concerts, lectures, and group affairs of all sorts. Around the middle of life is found also an inclination toward politics and philosophy. All the fields of activity of woman are influenced by her social interests, and inconceivable without this. In many dimensions of her life she does not serve herself but her environment.

VIII. Practical Applications: The Concept of "Psychological Age"

We consider as the main result of our biographical research the psychological pictures or portraits of the single phases of life.

[14] Erich Kollmann, *Bismarck* (in preparation).

It is possible to compute the average age at which the individuals pass through these phases. In this way our psychological portraits can be related to a certain chronological age, just as in childhood and adolescence a certain degree and type of intelligence is found to be characteristic for a certain chronological age level.

As a result of more extended research and with the help of more elaborate statistical methods, these portraits could be standardized, and *tests* for a systematic diagnosis of single personalities could be arrived at, similar to the manner in which intelligence tests were attained. That is, after we have found the average structures and corresponding ages for the different phases of life, we could then compare the single cases to see if a certain individual shows the characteristic mental structure expected of him at his particular age (perhaps also in connection with his particular personality type, vocation, etc.). It might be determined, for instance, that a person with a chronological age of thirty-five years was psychically not more than twenty-five years old. We could then call twenty-five years his *psychological age.*

Furthermore, similar to the IQ in children's intelligence development, also a *psychological quotient* (PQ) for the personal developmental status or general maturity of adults' personality could be defined as the ratio between psychological age on the one hand and chronological—or even "biological"—age on the other hand. Since, in contrast to child development, the relative weight of any given year in an adult life might be considered approximately equal to that of any other year, it might perhaps be still more reasonable to employ as a standard the difference between psychological and chronological (or biological) age instead of the psychological quotient. Similar to W. Stern's primary concept of intelligence difference, this difference could be called *psychological difference* (PD).

Both the chronological and also the "biological" age—as defined in terms of organismic functioning, strength, health, etc.—have already been taken into serious consideration in the giving of employment, insurance policies, and other cases. Based upon the results of our research, we would suggest that a third consideration, that of the "psychological age," might also be utilized in practical life.

Several suggestions for applying the viewpoints gained from biographical research have been made by Charlotte Bühler.[15] Physi-

[15] Charlotte Bühler, "The Curve of Life as Studied in Biographies," *Journ. of Appl. Psychol.,* 1935, XIX, 405-409.

cians might possibly be aided by an investigation to determine whether an individual's "psychological profile" corresponded to his age and, in general, by a knowledge of our results in regard to normal versus abnormal personality structures. Some of our results could also be utilized for prophylaxis in individuals weary of life. As Andics[16] showed in detail, at various ages various reasons for suicide are given, since the demands made in life in reference to profession and social possibilities change with age. Furthermore, advice in marriage could be given as to the psychological condition most favorable for permanence (see Section III).

Through the differentiation of the structure of long and short lives, it is, then, perhaps also possible to add new material for a prognosis from the psychological point of view about probabilities concerning the length of life in each particular case. For this purpose it is again necessary to determine the psychological age, since frequently the psychological age of persons who died early corresponded to much later chronological ages. Furthermore, a tentative diagnosis of the length of time during which an individual would be able to work in the various trades and professions might be given. Both types of diagnosis could be utilized for questions of vocation, life insurance, etc.

It should be mentioned, finally, that among the other possibilities mentioned an analysis could be made of "ripeness for retirement" in connection with the problem of old-age pensions. On the basis of a number of criteria, one should be able to determine if those intended for pensions have reached the proper psychological age. Among these criteria the way in which time is spent, the occupation with hobbies (art, theater, studies, reading, collecting), an inclination toward country life, an increase in religiousness, an interest in the subject of death, etc. could be used. With the answering of these questions, it would be determined if the unspecific activities which are characteristic of old age have already begun to supersede the "specific" vocational work. Furthermore, do the "duties" still play a large rôle, as is true for the period around the middle of life, or does fatigue in relation to one's duties and an increase in "wishes" and private life (family, social contact) take place? Finally, also the restriction in the number of activities of life could be used as an indicator (see Sections III-IV).

[16] Margarete Andics, *Lebensprobleme von Lebensmüden* (in preparation).

THE DEVELOPMENT OF MENTAL FUNCTIONS IN TWINS*

A. R. LURIA

Psychological Laboratories of the Medico-Biological Institute, Moscow

The Problem

A psychologist who analyzes the development of mental functions in children is confronted with the question whether, in different stages of development, the ratio of hereditary to environmental influence on such functions does or does not undergo a change.

The aim of the present investigation is to analyze the variability of the respective rôles of heredity and environment at different stages of the development of mental functions. This work is one of a series of investigations which are being carried out in the Psychological Laboratories of the Moscow Medico-Biological Institute.

A number of experiments carried out by Soviet psychologists on the initiative of L. S. Vygotsky[1] showed that the development of mental functions does not always take the same course and cannot simply be reduced to terms of continuous growth or to concepts of habit formation.

These experiments showed that we have to distinguish between at least two main types of development of mental functions in children. In some cases mental development may be a natural process, the best example of this kind being the maturation of nervous and mental functions corresponding to the growth of the organism; in

* Little, if anything, has been known so far in other countries about the research on twins carried out in Soviet Russia. It is frequently taken for granted that the ratio between genetic and non-genetic factors in mental functions remains constant, while Dr. Luria indicates in the present article that there are mental functions where this fundamental assumption does not hold good.—Editor.

[1] L. S. Vygotsky, "The Problem of the Cultural Development of the Child," *Journal of Genetic Psychology*, 1929, XXXVI, 415-434; A. R. Luria, "The Problem of the Cultural Behaviour of the Child," *idem*, 1928, XXXV, 493-506; L. S. Vygotsky, *Child Study in School Age*, 1929 (Russian); and *Child Study in Youth*, 1931 (Russian); A. N. Leontiev, *The Development of Memory*, 1931 (Russian).

other cases the development of mental functions is a cultural process; that is, the mental function undergoes considerable changes under the influence of social intercourse. An example of the latter is any acquisition of new modes of behavior, or any transformation of elementary functions into complex and indirect ones, such as the substitution of logical forms of memory for elementary ones, or replacement of the primitive, practical forms of thinking by discursive thought processes.

The second type of development differs in two essential aspects from the first. In the process of cultural development a mental function never remains the same, but undergoes a marked structural transformation, always changing from a direct into an indirect process. Simultaneously its relations to other functions change as well. In its further development the function begins to be determined more by the complex processes which are related to the higher thought processes than by the inner properties of the function itself. It also acquires new functional properties in the process of cultural development. It becomes voluntarily organized and has a much greater freedom in its manifestation than the primitive forms have.

The second difference between the cultural development of a mental function and its natural development consists in the fact that in cultural development the relations between man and reality are the motive power of progress. For human beings these relations are of a social nature. The higher psychological functions are developed by social contact, and in the first place by the intercourse of the child with adults. The first function developed in this process is speech, which is the main factor rendering these relations indirect; through speech the relations between mental functions are changed, and new forms of activity of the human mind are thus created. A good example is the development of discursive, verbal thinking, in which speech activity, formerly a process of intercourse between human beings, becomes an inner dialogue, and, in fact, a form of organization of thought processes.

This leads to the conclusion that in this form of development the mental functions do not remain unchanged at different stages of development, but undergo a thorough qualitative transformation. But if that be so, the question arises whether the ratio of heredity to environment in mental functions can remain constant in the various stages of development.

It is quite obvious that this ratio of genetic to non-genetic factors in mental functions can remain unchanged in cases where the mental function itself does not change. Such cases are frequent in psychology. Experiments show that the elementary forms of visual memory, and simple forms of sensation, change very little in the course of development and depend only to a small extent on the development of complex intellectual activity.

On the other hand, a number of psychological functions which become cultural in the course of development undergo a fundamental change in their psychological structure. In this case we may expect that the ratio of heredity to environment will not remain unchanged, and that in different stages of development the same function, while changing qualitatively, will be sometimes more and sometimes less genotypically conditioned.

* * *

By psychological investigations of twins the problem of the relative rôles of heredity and environment in the formation of mental functions has become the subject of serious scientific research. But while the respective rôles of heredity and environment in such complicated structures as general intelligence or peculiarities of character have recently been made the subject of detailed studies, the analysis of the changes which the hereditary component of mental functions undergoes with age has been almost neglected. Genetic investigation was usually limited to a rather summary examination of the influence of heredity on functions or their complexes. The majority of the investigators felt justified in evaluating together the data obtained for different ages, and in determining the influence of the genotype on the "average" mental process.

This assumption completely disregarded the fact that in the course of development a given function may undergo great qualitative changes, and took it for granted that the functions themselves, as well as their relation to the genotype, remain unchanged at various stages of development.

These assumptions are plausible, when we are studying very stable traits such as finger ridges or stature because their relation to the genotype is very similar at various stages of development, their indexes at younger ages being very close to those for more advanced ages. The data of Holzinger,[2] a summary of which we give in

[2] K. J. Holzinger, "The Relative Effect of Nature and Nurture Influences on Twin Differences," *Journal of Educational Psychology*, 1929, XX, 241-248.

Table I, are a good example of such a stable ratio of heredity to environment at various ages. But since the relation to heredity of even certain somatic traits changes in the course of development, because of a late appearance of the gene or of the increasing influence of environment,[3] it is plausible to assume that such changes will be particularly marked in those psychological functions which are subject to cultural development.

TABLE I

VARIABILITY OF THE RELATION OF TWO SOMATIC TRAITS TO HEREDITY AT DIFFERENT AGES. COMPARISON OF INTRA-PAIR DIFFERENCES (d) IN IDENTICAL AND FRATERNAL TWINS

	Junior Age (A)			Senior Age (B)			$\frac{B}{A}$
	Identical (d_1)	Fraternal (d_2)	$\frac{d_2}{d_1}$	Identical (d_1)	Fraternal (d_2)	$\frac{d_2}{d_1}$	
Finger ridges.....	3.2	21.7	6.8	3.6	22.9	6.3	0.9
Height.....	1.7	4.4	2.7	1.6	4.4	2.8	1.04

We decided to verify this hypothesis in our laboratory by an analysis of the relations of several mental functions to heredity at various stages of development.

In the present article we shall try to analyze the problem of the extent to which various forms of memory change their relations to the genotype at various stages of development, by making use of the preliminary data obtained in our laboratory by our collaborator N. G. Morozova. A detailed analysis of these data will be the subject of a special publication.

AGE VARIATIONS IN THE RESPECTIVE RÔLES OF HEREDITY AND ENVIRONMENT IN SOME TYPES OF MEMORY

To attempt the solution of this problem, we had to take at least two types of memory, one which represents the elementary memory process and remains to a certain degree unchanged during a long period of the child's growth, and another which changes in the course of development. Memory processes seemed especially suitable for our purpose as both of the above types are easily found among them.

The discrimination between these two types of memory appeared

[3] The latest data concerning stature throw a somewhat different light on the stability of its relations to heredity at various stages of development.

long ago in the literature on the subject. The first type was called the natural mnemic type; the second the artificial, mnemotechnical. Rinet pointed out "the simulation of an extraordinary memory" by means of purely logical devices. Similar examples are also quoted by G. E. Müller. Recently L. S. Vygotsky, A. N. Leontiev, and, to some extent, E. Brunswik have shown that these two types of memory are not two special forms, but rather two different stages or mechanisms of the development of memory in general. Experiments with memory processes at various ages showed that memory changes its structure in the course of development from a direct, mnemic form found, as a rule, in young children, into an indirect, logical one which appears at school age.[4] In other words, at an early age any process of memory may be reduced to an elementary retention of impressions and their direct reproduction. This is, at the beginning, an involuntary process caused by elementary stimuli. But at a more advanced stage, the process of memorizing becomes, in a number of cases, much more complex, and intellectual functions take part in its organization. Thus the child who, at an early age, *thought by remembering,* when he becomes older begins to *remember by thinking.* The same task of memorization is accomplished by means of an elementary mnemic process at an early age, and by means of a complicated mnemotechnical process at a more advanced age.

Is this process accompanied by any changes in the relation of these functions to genotypical factors?

To establish the rôle of genotypical factors in various forms of memory, and to observe all the changes which take place in the course of development, we have chosen a method for the analysis of the most elementary and stable form of memory, and compared it to another memory form which undergoes marked changes in the course of development.

Thus we have carried out the following three series of experiments.

Experiments with Optical Memory

For this purpose the memorizing of simple geometrical figures was chosen. The child was shown 9 geometric figures

[4] See A. N. Leontiev, *The Development of Memory* (Russian), Moscow, 1931; E. Brunswik, "Die Entwicklung des Gedächtnisse," *Beiheft zur Zeitschr, für Angew. Psychol.,* 1932.

which he had subsequently to identify among 25 others.[5] The results of this experiment have been calculated according to the formula: $S = \frac{m}{n+f}$, where m means the number of figures identified correctly, n the total number of all figures, and f the number of errors.

In this experiment, the procedure requires of all persons (both children and adults) a simple and direct fixation of a figure, with a subsequent search for it among 25 figures shown to the subject afterwards. This series seemed to be fully representative of the process of direct, optical memorizing in both pre-school and school ages.

Experiments with Indirect Memorizing of Words

Fifteen disconnected words, equally difficult to remember, were given to the subject, who was then requested to reproduce all of them. Though this task can be solved by simple, direct memorization, it can also be carried out (especially in the higher stages of development) by means of complicated intellectual processes.[6]

Experiments with Indirect Memorizing Words

In order to place the subject under such conditions as would force him to an indirect, intellectual memorization, we applied a method used in our previous experiments.[7] The child was asked to memorize a list of 15 words. Simultaneously, a picture was shown as an auxiliary significant sign for each word. Since in our series we chose pictures not connected with the words, the child was obliged to establish an artificial logical connection between them. After all words were memorized by means of the pictures every picture was shown to the child, and he had to reproduce the word connected with it. In the case of a good logical connection of the word with the picture, the reproduction of the word presented no marked difficulty, and we received a much higher percentage of correctly memorized words than in the test of simple elementary memorization. On the other hand, the inability to form such connections and to use the picture as an auxiliary sign showed that only

[5] This method was applied first by Prof. A. N. Bernstein in his psychiatrical studies. See his *Clinical Methods of Psychological Study of Mental Diseases* (Russian), Moscow, 1922.

[6] M. Foucault, "Sur la fixation des images," *Journal de Psychologie*, 1924, XXI, 522-572, 617-653.

[7] Leontiev, *The Development of Memory* (Russian), Moscow, 1931.

direct memorizing was applied; in these cases no higher memory scores were obtained.

These experiments have been carried out with two groups of twins, one of pre-school age (5-7 years) and the other of school age (11-13 years). Each group consisted of 12 pairs of identical and 12 pairs of fraternal twins.[8]

Age Changes in Memory Processes

Are the various forms of memory quantitatively and structurally identical at different ages?

In Table II we give the summarized data of our experiments, disregarding the fact that they have been obtained with twins.

Table II

Age Variation in Different Forms of Memory

Age	Number of Cases	I Visual Memory	II Direct Verbal Memory	III Indirect Verbal Memory
Pre-school age (5-7).....	54	0.54*	5.6	6.7
School age (11-13).....	46	0.73*	7.1	9.0
Increase with age.....	—	+1.35	+1.27	+1.34

*The Bernstein index ($S = \frac{m}{n+f}$); see previous page.

If we compare the figures which express the retention of given material in pre-school age with those obtained with children of school age, we note that with age all forms of memory have improved. But mere quantitative analysis does not reveal the structural changes which take place in certain forms of memory.

A qualitative analysis of these data brings out some very important facts to which attention must be drawn. We have found that the structure of the visual memory for geometrical figures is very elementary. Practically none of our subjects used indirect or logical processes for their memorizing in any noticeable degree, memorizing being reduced to an elementary visual fixation and subsequent recognition. A comparison between the junior and the senior groups of children showed no considerable changes in the

[8] We wish to point out that we consider our data as preliminary. Dr. Morozova's extended study is based on 100 pairs of twins.

structure of the process. The memorizing in the senior group remained as elementary and direct as in the junior one.

The qualitative analysis of the third group of data—indirect memorizing of words—yielded quite different results. The junior children had not been able to use the given means in a proper way and to build a logical connection between the picture and the memorized word. The majority of them memorized the words in the same direct way as they memorized the optical figures, or the words given orally. This was revealed by the fact that in many cases the memorized word was reproduced without any connection with the respective picture. In the majority of cases the child was unable to give any information as to the connection by which he memorized the word while looking at the picture, the answer being as a rule: "I simply remembered it." This was not due to a mere lack of introspection, but rather to lack of an indirect process of memorizing.

In some cases the picture proved to be a good auxiliary device for memorizing, not on account of a *logical* connection with the word, but because of a *visual* similarity. When using the picture as a sign for memorizing, these children did not form a logical connection, but tried to see the word in the picture. For example, the child memorized the word "sun," while the picture represented an axe. When answering the question, in what way he remembered the word, the child pointed to a small yellow spot on the axe and said: "Look, here is the sun."

This direct visual process of memorizing by means of pictures changes suddenly at school age, when it is achieved by means of a logical connection of the word with the picture. So, to use the same example, the word "sun" was memorized with the auxiliary picture "axe" by the connection: "one works with the axe, and the sparks glitter in the sun," or: "a man works with the axe on a sunny day," etc. The words reproduced were in a definite logical connection with the pictures. Only in rather rare cases was the picture visualized and memorized in the elementary, direct manner. Thus the qualitative analysis of the experiments of this series shows a fundamental change in the structure of the psychological process, and a transformation from a direct to an indirect, logical memorizing.

The second series—direct memorizing of words—does not give enough data for a satisfactory analysis. It shows only a slight ten-

dency in the senior group to change over to the complicated, logical type of memorizing.

The Respective Rôles of Heredity and Environment in Various Forms of Memory

Are there any changes in the relation of these processes to the genotype, which correspond to the changes in the structure of memorization?

Do the various forms of memory remain genotypically conditioned in the same way in both stages of development, or do some changes take place?

The preliminary data concerning these questions are given in Table III. The analysis of this table shows a considerable correspondence between the figures expressing the respective rôles of heredity and environment in various types of memory on the one hand, and their structural changes at various ages on the other. In spite of the fact that insufficient material allows of only preliminary conclusions, the general tendency is quite clear.

Table III

The Age Variations of Geno- and Para-typic Factors in Various Forms of Memory (Expressed as Average Intra-pair Differences (d) of Identical and Fraternal Twins)

Age	Number of Pairs		I Elementary Visual Memory			II Direct Verbal Memory			III Indirect Verbal Memory		
	Identical	Fraternal	Identical (d_1)	Fraternal (d_2)	$d_2 - d_1$	Identical (d_1)	Fraternal (d_2)	$d_2 - d_1$	Identical (d_1)	Fraternal (d_2)	$d_2 - d_1$
Pre-school (5-7)....	13	14	5.4	18.0	3.3	1.3	3.2	2.5	1.9	4.4	2.3
School age (11-13) .	11	12	5.6	14.0	2.5	.88	1.54	1.75	1.5	1.2	.8

Elementary Visual Memory

The first fact which attracts our attention is that the visual memory is genotypically conditioned in a very high degree. The small average intra-pair difference in the memory of identical twins of the junior group (as a rule, our identical twins gave almost identical results in this series) is 3.3 times smaller than in the fraternal twins. Almost the same ratio was found in the older twins. Here also the intra-pair difference in identical twins is very small, and, in fact, 2.5 times smaller than in fraternal twins.

By expressing these facts in coefficients of intra-pair correlation (Table IV),[9] we find that in both age-groups there is a considerable correlation with respect to this type of memory in identical twins, and none in fraternal.

Thus we may conclude (1) that elementary visual memory is to a high degree genotypically conditioned, and (2) that this relation remains unchanged in the senior age-group. According to our data the relation of the elementary visual memory to heredity and environment does not show any considerable change in the course of development, preserving its highly genotypic character at the school age as well as in early childhood.

TABLE IV

INTRA-PAIR CORRELATIONS OF VARIOUS FORMS OF MEMORY IN IDENTICAL AND FRATERNAL TWINS OF VARIOUS AGES

Age	Elementary Visual Memory		Direct Verbal Memory		Indirect Verbal Memory	
	Identical r S.E.	Fraternal r S.E.	Identical r S.E.	Fraternal r S.E.	Identical r S.E.	Fraternal r S.E.
Pre-school, 5-7 years.	.60±.12	.01±.20	.56±.14	—.35±.25	.58±.13	—.02±.20
School, 11-13 years..	.89±.15	.07±.10	.82±.20	.39±.17	.78±.22	.70±.10

r = Correlation; S.E. = Standard Error.

Direct Verbal Memory

The analysis of our experiments with direct memory for words yielded somewhat different results from the genetic point of view. In the junior age-group the genotypical character of the memory for words is as marked as in the case of the elementary visual memory. There is a considerable similarity of memory in the identical twins, while the intra-pair difference in the fraternal twins is 2.5 times higher than in the identicals. In Table IV this fact is expressed by a high correlation of the simple verbal memory in identical twins of pre-school age, and a low (here even negative) correlation of fraternal twins of the same age.[10] The elementary, highly genotypical character of this memory in children of pre-school age is quite evident. In the school age-group, however, the conditions are some-

[9] We give this table in spite of the fact that our material is not sufficient, applying the method of M. V. Ignatiev, which makes it possible to obtain intra-pair differences of traits in twins on a limited material with the smallest standard error.

[10] Because of a large standard error this negative correlation shows only the absence of a real, positive correlation.

what different. Again, in identical twins, the intra-pair difference is very small, in fact, even smaller than at pre-school age, but the fraternal twins also show a noticeable decrease of intra-pair difference. Since this decrease of the intra-pair difference in fraternal twins is due to environmental factors, we have to assume that actually some changes take place in the character of memory itself.

Indirect Verbal Memory

The tendency of the changes in the nature of memory becomes quite clear when we analyze the results of the third series of our experiments. Again, at pre-school age the indirect memorizing of words is, to a great extent, genotypically conditioned. In this respect it differs very little from elementary visual, or direct verbal memory. The intra-pair differences in fraternal twins are 2.3 times greater than in identical twins, who show a great similarity of memory ($r = .58$), while in the fraternal twins there is no significant intra-pair correlation. This is not surprising since by qualitative analysis we have found that both these types of memory are similar, i.e., elementary and direct at pre-school age. A genetic analysis confirms this fact, showing that the elementary character of memory is here, as well as in the preceding series, due to its considerable dependence on the genotype.

But we obtain quite different results when analyzing this type of memory in the senior age-group. For the first time in our series we find radical changes in the coefficients expressing the relation of a psychological function to the factors of heredity and environment. While at pre-school age the "indirect memory" shows a high correlation with genotypical influence, at school age this correlation is markedly reduced. Obviously, this change corresponds to the considerable changes which take place in the structure of the function itself, and which on the strength of a merely psychological analysis we have attributed to the fact that the process of memorizing becomes indirect.

The figures of our Tables III and IV make this sufficiently clear. We no longer see a marked intra-pair similarity in identical twins, simultaneously with a significant intra-pair difference in fraternals. The intra-pair differences, though very small in identical twins, are on the average even smaller in fraternals (the ratio being 0.8). In terms of correlation we find, for the first time, an intra-pair correlation similar in both identical and fraternal twins. In both cases

this correlation is very high (.78 and .70, respectively), showing that the genotypical factors are here obscured by the similarity of those environmental, cultural factors to which every pair of twins is exposed, regardless of whether they are identical or fraternal.

We are here confronted with a special process of transformation in the ratio of the genotypical to environmental influences in mental functions, which takes place during the subject's life-time.

From the psychological point of view it is easy to understand how these radical changes occur. As a matter of fact, the function itself undergoes a gradual transformation, so that the same task is performed by different processes at various stages of development.

Summary

Studying a number of psychological functions in their relations to heredity and environment, we have found that there are groups of psychological functions which (even when belonging to the same memory group) have different structures at various stages of development. There are some elementary functions whose structure remains unchanged during the whole period of development, and which preserve to a great extent a stable relation to the genotype at various ages. To this group belongs, for instance, the elementary visual memory. On the other hand, there is a group of functions which in the course of development undergo great structural changes, i.e., from elementary and direct forms into complex and indirect ones. The relation of these functions to heredity and environment does not remain unchanged. With the transformation of the function into a higher, complicated one, its relation to genotypical factors becomes indirect, and the degree of genotypical influence greatly decreases. This suggests that those complex psychological processes which form the basis of higher mental functions are largely determined by non-genetic factors. An example of such functions is indirect memorizing, the development of which at various ages can be easily traced in our psychological experiment.

Thus there is a group of psychological functions which in the course of development undergo changes in their relation to the genotype. Their development sets in when the elementary mental processes (genotypically conditioned to a high degree) are transformed into complex, socially conditioned functions.

We have grounds for assuming that these functions include not only memory functions, but that all higher mental functions are of a

similar origin. We believe that we have described a special process of development which enables us to understand the growth of the complex forms of psychological activity.

Finally, this investigation leads to the conclusion that owing to those deep structural changes which take place in the development of many psychological functions, the age factor must be seriously taken into consideration, in every psycho-genetic investigation, and that every study concerning the respective rôles of heredity and environment in the formation of mental traits must consider the data from the point of view of the genetic age.

THE PROBLEM OF HUMAN TYPES: COMMENTS AND AN EXPERIMENT

DAG BRYN
Oslo

The great interest which during the last ten years or so psychologists—especially in the German-speaking countries—have been taking in the problem of human types, is more than merely theoretical. Psychology has come nearer to reality. As an applied science it must tackle problems outside the walls of the laboratory, in fact, problems which require knowledge of a human being's reactions and attitudes in everyday life.

A rough knowledge of the human personality appears to have become more urgent than detailed insight into the intrinsic nature of its various psycho-physical functions; and a step towards obtaining a total view of an individual's mental make-up is to classify him under one of a small number of types.

This seems at least to be one of the chief reasons for the abundance of recent literature dealing with the problem. The practical psychologist, however, is here confronted with the somewhat embarrassing task of choosing between a number of different systems of classification, because the investigations and their results have been determined far less by his practical needs than by the theoretical standpoint of the respective school, such as that of Jung, Kretschmer, or others. Still, the common traits of the various systems of classification are so conspicuous that their unification seems desirable.

As E. R. Jaensch pointed out, the ideal division into types should conform to the "natural" system; i.e., starting from the human being as general psychology knows him, it should proceed through the two broad bisecting types at the top of the system, right down to the bottom represented by the individuals themselves.

At the top of the system, represented by the main types, resemblances between the various schools can be found, and a unification seems possible. Such unification would be of great value to the

practical psychologist if it enabled him to reduce his diagnostic methods to a relatively small and reliable battery of tests.

To this end various investigations have been carried out in the Psychological Institute of the Oslo University. One of them will be described in this article.[1]

Although the practical aim of the experiments was to establish a battery of tests, of known diagnostic value, it was also hoped that they might throw some light upon the differences between the type-delineations of the various schools, as well as on the causes of these differences.

From the numerous typological systems we have chosen those of Hermann Rorschach and E. R. Jaensch. The usefulness of the first was well known to us from earlier experience, while the latter enabled us to extend our research to the psycho-physical functions of personality. We shall confine ourselves to a summary of the main characteristics of the types of each school. Readers who wish to learn more about the two systems, and particularly about their sub-types, are referred to the original publications.[2]

The Types of Rorschach and Jaensch

Rorschach divides human personalities into two types, which he names the extrotensive and the introversive. He characterizes them as follows:

Extrotensive	Introversive
Intelligence of a more stereotyped kind.	Intelligence of a more differentiated kind.
More reproductive in his mental life.	More original and productive in his mental life.
Mind turned more outward (Extrovert).	Mind turned more inward (Introvert).
Unstable emotional life.	More stabilized emotional life.
Better adjustment to reality.	Less well adjusted to reality.
More extensive than intensive intercourse with others.	More intensive than extensive relations to others.
Excitable, unstable motility.	Measured, more stabilized motility.
Adroitness, manual dexterity.	Awkwardness, clumsiness.

[1] I wish to express my sincere thanks to the Directors of the Institute, Professors Harald Schjelderup and Anathon Aall, and to several colleagues and public authorities, who have been of great help to me during the work, particularly Henry Halvorsen, M.A., Dr. B. Ribsskog, and the Headmaster of Vålerengen Primary School, etc. Above all, I am indebted to Prof. Schjelderup, under whose direct supervision the work was carried out.

[2] The main work of Hermann Rorschach is *Psychodiagnostik* (2d ed., Berne, 1932). A comprehensive book by Jaensch and his pupils is *Grundformen men-*

Except for this short and rather abstract description, Rorschach has never given any fuller and more detailed account of his types. Nevertheless, their resemblance to the extrovert and introvert types respectively, as known from everyday life and described especially by American psychologists, is obvious.

Of the system of Jaensch and the Marburg school a clear description is by no means easy; not for want of material, but rather a somewhat confusing abundance of it; for in its rapid development Jaensch's typology has attained a rather high degree of elaboration.

Starting from his studies on eidetic imagery, Jaensch found among his subjects two distinctly different types: the B-type, whose eidetic images were rather fluent, and who showed more or less pronounced signs of exophthalmic goitre (*morbus Basedowii* or Graves's disease); and the T-type, with whom eidetic images were more rigid and symptoms of tetanus could often be found.

Jaensch soon extended his investigations from this particular kind of sensation and perception to cognitive functions in general. In the majority of them, he found, in varying degrees, what he called "latent eidetic imagery," which he explained as the outcome of two contrasting principles, or structural patterns; these could be found, not only throughout the mental, but also in the physical processes, being in fact characteristic of the organic, as opposed to the inorganic, phenomena.

These two contrasting principles, which are supposed to be present in every individual, and of which one dominates the individual's mental life and makes him a "type," Jaensch terms integration and disintegration. In this new system the old B- and T-types have become sub-types of the integrated and the disintegrated type respectively.

Jaensch has never given a clear description of his two main types. Of his various sub-types, we shall mention only two, the general and outward-integrated type (I_1), which may serve as an instance of a normally integrated type, and the inward-integrated type (I_i), which in most of the experiments of the Marburg school represents the disintegrated mode of reaction.

With I_1, sensations show marked plasticity and subjectivity. Emotions are strong and connected with real images or physiological

schlichen Seins (Berlin, 1929). The best survey of the Rorschach typology in English is given by Philip E. Vernon in "The Rorschach Inkblot Test," *Brit. J. Med. Psychol.*, XIII, in which the author also briefly mentions the types of Jaensch.

causes. Images are clear and detailed. Memory is realistic and comprehensive. Imagination tends to have bodily effects; owing to quick and intensive experiencing, an individual of this type is soon exhausted. Although very delicate, he is generally gay, unreserved, has natural manners and more "feminine" traits. In his behavior he is actuated by instincts, seldom trying to analyze himself; his outlook on life is subjective. His will-power is not often at cross-purposes with his emotions and drives; he is moral as a matter of course, and not because he is aware of binding moral laws.

Typical of I_1 is marked interpenetration of sensation and imagination. With the other type, the inward-integrated type (I_i), little interlacing of these two processes takes place. Clear, visual images do not come readily to him, but he has motor and dynamic ones which conform with his more active and practical attitude to reality. His motor activities are directed towards an aim. This is very marked in his behavior in sporting contests, when his whole mental apparatus seems to be switched off. The intellect of I_i is practical and realistic; of poetry and arts he only appreciates those of a realistic or naturalistic kind. He is not very given to sociability with his fellow-men, but tends to keep aloof. However, he is no hermit, for he lives and works in the world of real things. He takes his time to make up his mind, but a decision once taken by him is not easily changed. He has less power of adaptation to new situations than I_1.

We hope that this short description of the polar types of the Rorschach and Jaensch systems is sufficient to show the similarity of the extrotensive and integrated, as opposed to the introversive and disintegrated type, as well as many points of difference. It will be noted that the similarity is greater at the extrotensive-integrated pole.

The Experiment

The Rorschach types were diagnosed in our experiment in the usual way by means of the ink-blot test.[3] As a representative diagnostic method of the Jaensch types an experiment was chosen which may be called the "plane-vision experiment."[4] We supplemented it

[3] For a description see Vernon, *ibid.*

[4] On the special advice of Dr. W. Jaensch in Berlin. The experiment was described at greater length in "Ueber den Aufbau des Bewusstseins" by E. R. Jaensch and collaborators (Supplement XVI, *Zeitschrift für Psychologie*, 178 ff.). The stereoscopic vision experiment is found, *ibid.*, pp. 128 ff. For practical reasons we used in both cases a slightly different apparatus.

with a stereoscopic vision experiment, which was said to give parallel results. Our experiments, however, did not confirm this assumption.

The plane-vision apparatus consists of a round steel rod about two meters long (a, Fig. I). At both ends the rod is fixed, vertically, to a frame; its lower end is fastened in a ferrule. A grey cardboard provides a homogeneous background for the full length of the rod. The rod is elastic and can, by means of a horizontal rod (b) fastened to the middle of it, be drawn to form a curve. The degree of deflec-

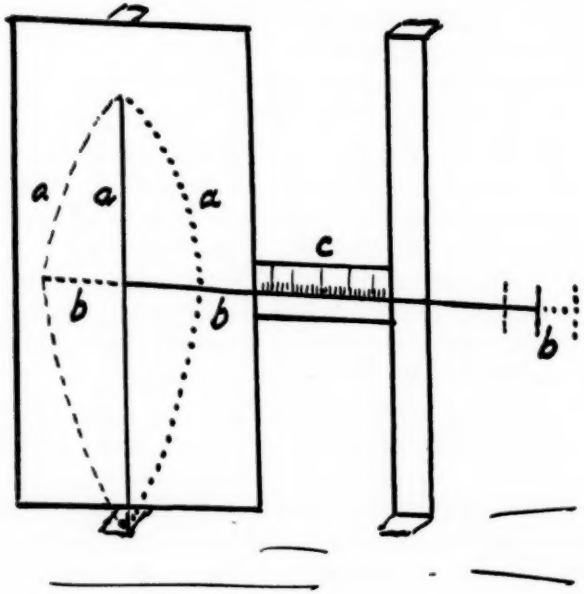

FIG. I.

tion can be read on a millimeter scale, along which the horizontal rod slides.

The subjects had to sit down at a distance of two meters from the apparatus and fixate the rod. They put on a pair of spectacles with prismatic glasses. The lenses used had a deflection angle of 15°, and were arranged in a different way for each eye. When looking through such spectacles the subject sees all straight lines—in our case the rod—as curved. To compensate the effect of the spectacles the experimenter pulled the rod in the opposite direction until it appeared straight to the subject; this procedure was repeated after 1, 3, 5, and 10 minutes. Then the spectacles were taken off, and

the rod was put in a "subjective" vertical position according to the directions of the testee (this procedure also was repeated after 1, 3, and 5 minutes).

Most persons show adjustment to the unusual visual impressions, though in a different degree. Now, Jaensch and his disciples claim that the integrated type, in accordance with the greater flexibility and subjectivity of his sensations, has a better adaptability than the disintegrated type. That is to say, the integrated type needs a smaller deflection of the rod to obtain subjective "straightness" and, in the course of time, little or no deflection at all. Moreover, the after-effect, consisting in the impression that the rod is curved while it is objectively straight, is less marked and lasts for a shorter time. The disintegrated type presents the opposite effect: less adaptation, i.e., great deflection of the rod is needed to obtain the impression of straightness, and lasting after-effects.

The subjects in our experiment were 28 men and 33 women, most of them students in their first year at the University, and 24 boys and 31 girls, aged 10 to 14 years, pupils of a primary school in Oslo.

To obtain a measure of the reactions in the plane-vision experiment, we took the average of the subject's five scores (measured in centimeters, objective deflection of the rod when in a subjectively vertical position). There are other possible ways of getting a quantitative measure of the "degree of adaptation," but we cannot discuss them here. On the strength of this average score the subjects were ranked.

Rorschach did not try to rank his subjects quantitatively. The chief factor indicating the introversive as opposed to the extrotensive type is the proportion of "kinaesthetic responses" (B-responses) to color-responses (Fb-responses). For statistical reasons we expressed this proportion as the quotient $\frac{B-Fb}{B+Fb}$. Thus we obtained a progression ranging from $+1$, a high degree of introversion, to -1, the extreme degree of extrotension.

Other factors which we have measured quantitatively were the so-called dilatation in distinction to coartation,[5] expressed as the sum total of kinaesthetic and color responses, and the "type of apper-

[5] Coartation, characterized by none or only occasional kinaesthetic and color responses in the Rorschach test, stands for reduced or inhibited emotional and imaginative life; dilatation, characterized by the occurrence in the same subject of several color as well as kinaesthetic responses, stands for an abundance of emotional and imaginative mental processes.

ception."[6] As a single index for this last factor we have taken the proportion $\frac{G}{D+Dd}$, where the "whole responses" (G) and the "detail responses" (D) were treated as units, while the "small detail responses" (Dd) were calculated as 1.5. A few subjects with $\frac{G}{D+Dd}=0$ were excluded.

The Results

The number of our subjects was not very great. Nevertheless, we think that it was large enough to allow of some quantitative conclusions.

All our subjects showed adaptation in the plane-vision experiment. That is to say, assuming that the symptomatic value which Jaensch attributes to this factor be correct, the completely disintegrated type was not represented in our material.

The children showed better adaptation than the adults, but the difference was not great, the averages being 0.83 and 1.0 for the children group and the adult group respectively. Among the children the elder ones, representing the onset of puberty, showed less adaptation than the younger. This result conforms with the thesis of Jaensch that the adaptive, i.e., integrated, type is the type of childhood.

Females showed greater adaptation than males both in the children and the adult group. When we arranged the subjects in three groups (following approximately Gauss's dispersion) according to their degree of adaptation, we found (in per cent):

	Men	Women	Boys	Girls
Great adaptation	18	37	13	39
Medium adaptation	50	37	50	43
Small adaptation	32	26	37	18
Total	100	100	100	100

This result, too, is in accordance with the theory of Jaensch that the antithesis, integrated-disintegrated, is also an antithesis of sex.

A similar analysis of the responses in the Rorschach test did not yield very conclusive results, although various statistical devices were tried. However, there was a slight tendency towards extrotension among the children in comparison with the adult subjects. The only factor which showed a clear correlation with age was the dilatation-coartation proportion, the children being much more coarted, i.e., undeveloped or inhibited as regards emotional and mental proc-

[6] Rorschach's *Erfassungstypus.*

esses, than the grown-ups. The children's average sum of kinaesthetic and color responses (B + Fb) was 1.5; for our adult subjects the average of (B + Fb) was 4. This may be as much due to the different social status of our children when compared with that of our adult subjects, as it may be a symptom of biological nature.

The third factor in our analysis of the results in the Rorschach test, viz., the type of apperception, also showed a marked variation with age, the average tendency to "whole responses" (G) being more marked among the grown-ups than among the children.

* * * *

As Jaensch has repeatedly pointed out, a factor varying with age and sex is often of interest to human typology, because the opposites, child-adult and woman—man, represent differences of type as well. This thesis of Jaensch has its foundation in popular psychology which attributes to the child (and the woman) traits of the integrated (extrotensive) type.

We have already mentioned the differences of age and sex in the plane-vision experiment. As regards our Rorschach results, the extrotensive tendency of the children is too small to allow of definite conclusions. But can we conclude that coartation and the tendency to detail responses is a characteristic of the hypothetical integrated-extrotensive type? Certainly not, as the comparison of the scores of our subjects in both experiments shows.

None of the three factors of the Rorschach test (viz., extrotension-introversion, dilatation-coartation, and the ratio of whole to detail responses) showed any definite, clear-cut correlation with the degree of adaptation in the plane-vision experiment. There seemed to be a slight tendency towards dilatation and extrotension among the subjects with high degrees of adaptation. Conversely, however, coartation and introversion do not seem to have any connection with the lower degrees of adaptation. As to the third factor, a connection between whole-responses (G) and high degree of adaptation seemed somewhat more marked; between the respective opposites, viz., the tendency to detail responses and a low degree of adaptation, no connection could be traced.

We may conclude that, taken as a whole, our material did not substantiate, in any satisfactory degree, the view that the scores in the Rorschach and the plane-vision tests are symptomatic of the same pair of contrasting types. We abstain from giving any figures,

because our material was too small for the application of finer statistical methods.

Diagnosing Personality Types

The practical aim of our investigation, to procure material for a battery of reliable typological tests which would be easy to handle, was not reached.

As a matter of fact, in the exact meaning of the words—battery of *tests*—is an aim which, in our opinion, cannot be reached. The complex layers and the fundamental trends of human personality cannot be defined by quantitative test-scores.

The plane-vision experiment gives relatively constant and definite results, because it is an instrument of what Fritz Giese has aptly called "psychological surface-diagnosis"; that is to say, it is testing those "outer" layers of personality, through which an individual communicates with his surroundings (sensation, etc.).

The Rorschach test takes an intermediate position in this respect. It examines the higher forms of apperception, the borders of phantasy and imagination. That is, in our view, the chief reason why it will hardly correlate well with tests such as the plane-vision experiment, in spite of Jaensch's assumption that all functions of a certain human type have a common structure.

Moreover, the Rorschach test must be taken as a whole. None of its factors can be singled out and treated separately. That is why we have little confidence in a statistical elaboration of the test. It is as much an instrument of art as one of scientific investigation. The interpretation of its results and their combination into a psychogram gives, and must always give, ample room for the intuition and the interpretative skill of the tester.[7]

We think the Rorschach test well suited to form part of a stock technique of personality diagnosis. However, it has, in our opinion, one serious defect which it shares with most tests of complex mental functions (including intelligence tests). The interpretations depend on *verbal* formulations, and even on rather fine nuances in these formulations, on the part of the testee. For this reason we think this test much less suited for children and for proletarian classes whose power of verbal expression is much less developed than that of adults of the cultured classes.[8] To this fact we ascribe some of

[7] We are here quite in agreement with the views expressed by Philip Vernon in his article, "The Significance of the Rorschach Test," *Brit. J. Med. Psychol.*, 1935, XVIII.

[8] Hints to the same effect are found in the above-named article of Vernon.

the discrepancies in our material, e.g., the coartation of the children. Our children came from a school in a typically proletarian district, while our grown-up subjects belonged mostly to the intellectual middle class.

A Few of Our Cases

In the introductory remarks to this article we expressed the hope that the investigation might throw some light upon the theory of human types. Although the statistical proof of common background of Rorschach's and the Jaensch's types was rather abortive, we could not help feeling that the two systems are by no means unconnected. We have, therefore, examined our adult material somewhat more in detail, and in carrying out this qualitative analysis we applied what Jaensch calls the "structural" method, by choosing the extreme types, i.e., the subjects who showed extreme constellations of the various factors, as the objects of our qualitative analysis. We must, however, confine ourselves to just a few short instances of this individual analysis.

First, let us discuss two of our female students, Si. Gri. and An. Haa., whose results are very similar. Their scores in the various experiments showed a discrepancy of a similar kind. Both showed a high degree of adaptation in the plane-vision experiment. On the other hand, coartation (reduced imaginative life), detail responses, and some other symptoms in the Rorschach test indicated a reproductive rather than a creative mental activity. An. Haa. showed a higher degree of adaptation and was, at the same time, the less coarted (on the extrotensive side) of the two girls.—Diagnosis: The average, "everyday" type of extrovertive personality whose mental processes show little differentiation.—Our general observation seems to confirm this conclusion. Both girls represent the "common" type with regard to intelligence as well as temperament, An. Haa. being more child-like in her motor activity and expression.

Ro. An. was another subject in the same statistical column: high degree of adaptation, but complete coartation. At the same time, many symptoms in the Rorschach test indicated intelligence combined with depressive traits or emotional disturbances. We diagnose: coartation is here not a primary phenomenon and does not adequately describe the subject's personality; his mental processes are impaired by emotional factors.

Another subject, Oey. Nii., showed a contrast of the opposite kind: rather low adaptation with considerable dilatation (abundance of

higher mental processes). His score in the Rorschach test stamps him, in Rorschach's own words, as a self-centered, extrotensive type —much to our astonishment, because his manner gives the impression of the introvertive type. The symptoms of intelligence in the test show some weak spots. Our general impression points in the same direction. He seems to possess a rather cramped intellectual activity, which is not founded in adequate abilities. In a letter in which he comments on our diagnosis he admits that he sometimes sets himself an intellectual aim beyond his reach; but he adds: "What about the effect of the will-power in these matters?" A conversation with his mother revealed that his family had the greatest expectations of him.

Another subject of the same group, Jo. G., also showed little adaptation together with considerable dilatation. Her mental processes were rather of the reproductive kind. She gave the impression of marked graciousness, but a graciousness of the cold, intellectual, far too conscious kind. She was wholly devoid of the childlike, impulsive contact with others.

As opposed to these examples where the outstanding feature was some kind of discrepancy between the results in the plane-vision experiment as compared with the Rorschach test, we will now mention a case where the correlations of the results conformed with expectation; such cases were, on the whole, more numerous.

Ev. Va. showed a very strong tendency to whole responses (G), their proportion to detail and small-detail responses $\frac{(\ G\ )}{D+Dd}$ being = 33. In the plane-vision experiment she might have shown a still larger adaptation than she actually achieved, had she been able to concentrate. When asked to look through the spectacles at the window, she remarked: "How queer! A second ago it was curved; now it is quite straight. It is a matter of concentration." Her sensations can, so it seems, be altered at will. Her general conduct and her scores in the Rorschach test clearly indicated a submanic, cyclothymic type.

Satisfactory correlations were also found at the other end of the scale, represented by plain, coarted types with a slightly marked extrotension or introversion and showing little adaptation in the plane-vision experiment. However, these types do not seem to be characterized by an extreme, but only an average, tendency to detail-responses.

These short instances of our qualitative analysis should only illustrate our thesis, without claiming to give a convincing picture of the connections which, in our view, can be traced in our material.

Summary and Suggestion of a Theory

We may summarize our views as follows: Both the plane-vision experiment and the Rorschach test examine mental functions of the same kind, belonging to the cognitive apparatus, but of different complexity. The plane-vision experiment investigates the more elementary, i.e., sensory functions; the Rorschach test, those bordering on phantasy and imagination, with which also emotional and conative functions are interwoven.

The "adaptive" (by Jaensch called integrated) reaction in the plane-vision experiment seems to be characteristic of that broad human type which has been described in psychological literature under various names and is most often called the extrovertive type; it seems to show more female, childlike traits. This type is not identical with the extrotensive type in the Rorschach test (the "color"-type), although Rorschach's description of his type shows many points of resemblance.

There is no general parallelism between the two tests. A connection seems to exist between the "integrated" and the "dilated" type of experiencing, as well as the type of "total" (G) apperception. Conversely, however, no direct connection can be found between the "disintegrated" attitude and the coarted type or that of detail apperception.

If we extend Rorschach's type of abundant emotional and mental processes[9] with dilatation and "total" apperception as its chief factors, to cover a developed apparatus of higher mental life, we may explain this connection by the following tentative hypothesis.

The "integrated" structure of the rather elementary cognitive functions is representative of a more primitive kind of the extroverted, childlike, feminine type of personality.

An integrated structure affords, under certain circumstances, the best conditions for the growth of the type rich in the faculty of emotional and imaginative experiencing.

The above-named "circumstances" are best illustrated by their opposites. In the first place, unfavorable living conditions, proletarian status, the necessity to concentrate on the satisfaction of the

[9] *Reicher Erlebnistypus.*

elementary biological needs, hard work, the anxious and restless strife for existence in modern business life—all these factors tend to hamper the development of the type rich in emotional and mental processes. This formulation gives a further explanation of the poor type of experiencing prevailing among the proletarian children in our material—in addition to the factor implied in the Rorschach method itself. Also it tallies well with our impressions derived from several years of testing "common people." In our present experiment this type could be found in the adult group among a certain kind of industrious students whose hard work for the sake of acquiring the necessary quantities of knowledge left them with but little capability of enjoying life and scientific study.

Furthermore, the development of a type rich in the faculty of experiencing is hampered through emotional factors of a neurotic kind. This statement has, of course, only scanty support in our Rorschach results and in our knowledge of some of the subjects, but seems to be sufficiently established by the experiences of various investigators who have administered the test.

To obtain a deeper insight into the cases of this kind we have to use (e.g., psychoanalytic) methods which go to the deeper layers of personality; and this holds good for typology in general. In fact, there is no short cut to insight into a human being's psychology, not even when we merely aim at his classification as a type. Painstaking study with the best methods will be required before we can hope to build up a concise and adequate diagnostic technique.

That is one of the reasons why we do not intend to enlarge on this problem by attempting a theoretical elaboration of the hypothesis here presented.[10] The other reason is the need for further comparative studies along the lines of this investigation, for we think that work with these and kindred methods might prove fruitful to the development of typology.

[10] This has been attempted at length in the original paper (unpublished), "Mennesketyper," written as a thesis for the M.A. degree at the Royal Frederics University, Oslo, 1932.

DYNAMICS OF THE GESTALT PSYCHOLOGY
PART III

WILLIAM McDOUGALL
Duke University

In this third section of this article I propose to discuss Kurt Lewin's treatment of the problems of action. I hope to add in a fourth and final section a few critical remarks applicable to the views of Köhler, Koffka, and Lewin alike.

It is evident that Koffka stands midway between Köhler and Lewin. While these two have little in common, Koffka has much in common with both. I am inclined to suppose that Koffka has attempted to graft Lewin's views onto the Köhler stock, and that the baffling complexity and immense length of his treatise is largely due to this heroic endeavour. A comparison of his two books seems to bear out this interpretation.

Lewin carries to an extreme some of the more unfortunate peculiarities of the school. He is more anti-biological, more completely indifferent to all knowledge acquired about organisms and their nervous systems, more inclined to excessive abstraction and crude symbolism. While Köhler remains essentially a physicist, Lewin remains a metaphysician.

These peculiarities appear in all his writings but are consciously put forward in a manifesto which appeared some years ago.[1] Much might be said about this essay. I will characterize it briefly as, in my opinion, perverse and mistaken in almost every point, and refer with general approval to the criticisms of it offered by N. Margineanu.[2] I will add that the program laid down for psychology is fantastically remote from all possibility of realization. For the

[1] "The Conflict between Aristotelian and Galileian Modes of Thought," *J. Gen. Psychol.*, 1931, V, 141-177. This and others of Lewin's articles are brought together in the volume *A Dynamic Theory of Personality, Selected Papers* (New York, 1935), translated by D. K. Adams and K. E. Zener. Page references to Lewin's work throughout this article refer to this volume.

[2] "Professor Lewin's Conception of Laws," *J. Gen. Psychol.*, 1935.

essence of this article is to repudiate, as Aristotelian, all explanation which depends in any way upon classification, and to demand that all such explanations be replaced by precise descriptions of the field of forces constituted by the organism under investigation together with its environment.[3]

[3] "The dynamics of the processes is always to be derived from the relation of the concrete individual to the concrete situation, and, so far as internal forces are concerned, from the mutual relations of the various functional systems that make up the individual" (*ibid.*, p. 41).

It is perhaps worth while to point out that even the chemist cannot yet deal with his simplest problems in the terms demanded by Lewin as alone permissible in psychology: the chemist also relies on the despised Aristotelian method of classification when he predicts or explains. If you ask him to predict or explain the result of passing an electric spark through a mixture of two gases, his first and chief step is to classify the molecules of gas in the mixture; and then, having classified them as, say, hydrogen and oxygen, he invokes the familiar empirical fact of their affinity for one another. But what *affinity* means in terms of forces, and what happens exactly at the moment of explosion and so on and so on, for all such Galileian problems, he has only highly fanciful speculative suggestions. Yet the physico-chemical problems involved in a simple action of a very simple organism are, I suppose, at least one thousand times more complex. In short, classification is the essential basis of all empirical generalization, of all induction, and therefore of all science. Lewin in deprecating classification reveals his predilection for the metaphysical method of deduction from *a priori* propositions. In this connection I cannot forbear to cite Whitehead: "The things directly observed are almost always only samples. We want to conclude that the abstract conditions, which hold for the samples, also hold for all other entities which, for some reason or other, appear to us to be of the same sort. This process of reasoning from the sample to the whole series is Induction. The theory of Induction is the despair of philosophy—and yet all our activities are based upon it." (*Science and the Modern World,* New York, 1925, p. 34.) And *á propos* of Lewin's deprecation of our respect for 'frequencies,' I cite the same authority on 'recurrences' [an alternative designation for the same fact]: "On every side, we are met by recurrence. Apart from recurrence, knowledge would be impossible; for nothing could be referred to our past experience. Also, apart from some regularity of recurrence, measurement would be impossible. In our experience, as we gain the idea of exactness, recurrence is fundamental" (*ibid.*, p. 45). Here we find Lewin and Whitehead in acute opposition as to the foundations of all science, and I venture to think that Whitehead is exactly and obviously in the right.

Further the whole of this book of Whitehead and much of his other writing is devoted to the demonstration that the Galileian way of conceiving the world is fallacious and fatal to progress, not only in the biological sciences but also in physics itself. The thesis is conveyed perhaps most concisely in the following passage referring to the modern era and the influence of Galileo: "There persists, however, throughout the whole period the fixed scientific cosmology which presupposes the ultimate fact of an irreducible brute matter, or material, spread throughout space in a flux of configurations. In itself such a material is senseless, valueless, purposeless. It just does what it does do, following a fixed routine imposed by external relations [Lewin's vectors] which do not spring from the nature of its being. It is this assumption that I call 'scientific materialism.' Also it is an assumption which I shall challenge as being entirely unsuited to the scentific situation at which we have now arrived" (*ibid.*, p. 24). Lewin's dynamic formula is just one more attempt, rather more subtle than most, to impose just such scientific materialism upon psychology. "The intolerant use of abstraction is the major vice of the intellect." And "Mathematics is thought moving in the sphere of complete abstraction from any particular instance of what it is talking about." These wise remarks of Whitehead's should be pondered by Lewin until

This at once reveals Lewin's strong anti-biological bias. For, of course, classification is the foundation of all biological explanation and understanding. Let us take him at his word and present him with a behaviour problem. Lewin identifies power of explanation with power of prediction. Very well. Here is a small animal. Can he by Galileian methods make any slightest prediction of its future behaviour? No—none whatever. Whereas a naturalist, proceeding by the Aristotelian method of classification, identifies its place in the animal kingdom, pronounces it, let us say, a bird, in fact a swallow of a certain species; and, in the light of a vast store of more or less systematic biological knowledge, is able to predict that (barring accidents) the bird will migrate from England to Africa about three months hence. Perhaps he may make many other predictions of its behaviour with high degrees of probability.[4]

On the other hand, Lewin, in so far as he consistently repudiates the Aristotelian method, the method based on classification, can make no slightest prediction of this or of any other animal behaviour.

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he understands them; he might thus be cured of his itch for extreme abstraction, for pretense of mathematical treatment where none is possible, for vectors and topology. I add the following very recent pronouncement by a leading physicist, E. Schrödinger: "It has become the orthodox view of physicists today, that the momentary state of a physical system does not determine its movement or development or behavior to follow; nature is supposed to be such that a knowledge of state, sufficiently accurate for sharp prediction of the future, is not only unobtainable but also unthinkable" (*Nature,* July 4, 1936).

[4] We may see a more ingenuous manifestation of this same anti-biological, anti-Aristotelian bias in a recent article from further East. Mr. Z. Y. Kuo ("Anti-Heredity in Psychology," *Psychol. Rev.,* 1929, XXXVI), having distinguished himself some years ago by rejecting instincts of men and animals with a thoroughness that put all behaviorists to shame, now finds that he is logically compelled to follow the same line to its bitter end and to reject heredity entirely, thus lining up with that hitherto solitary figure, E. B. Holt. Kuo writes: "Those who are not willing to accept McDougall's hormic theory, certainly cannot make any other choice." And the statement is, I think, indisputably correct. For Kuo, as for Lewin, the task of the psychologist is to describe specific instances of concrete behaviour. "I do not think that in our behaviour studies we need the concept of hereditary potentialities at all. [Nor does Lewin.] Behaviour is not a manifestation of hereditary factors, nor can it be expressed in terms of heredity. It is the direct result of environmental stimulation . . . is a passive and forced movement and solely determined by the structural pattern of the organism and the nature of the environmental forces." Again: "A psychology without heredity is a psychology which proposes to do away with not only the concept of heredity and instinct but also all their related concepts, such as habit, trial and error, imitation, insight and purpose. It proposes to study behaviour as concrete actualities and refuses to be muddled up with any abstract and teleological concepts . . . Specific stimuli determine specific responses; given a stimulus, a definite response can be predicted. What else do we need besides this for the scientific description of behaviour?" Here, purified from all Aristotelian nonsense, is Galileian thinking *in excelsis*! Is Lewin headed for this sort of thing? Much of his writing is appositely described by the passages cited from Kuo.

But, if you report to him the fact that this particular bird has migrated, he can explain the process in Galileian terms, and achieves this by the use of a certain formula. Since this formula is equally applicable to wellnigh all instances of human and animal behaviour and constitutes the core and essence of Lewin's dynamics of behaviour, we must examine it hospitably yet critically.

Lewin's Dynamic Formula for the Explanation of Behaviour

Every instance of behaviour falls under one or other of two heads; it expresses either a desire or an aversion (as used to be said in the dark ages), is a movement towards a goal-object, or a movement away from such an object. In any case of movement of a creature, *S*, towards a goal-object, *G*, we may deduce (from Galileian principles) that a force emanating from *G* attracts or pulls *S* towards *G*. And, equally, in every case of retreat of *S* from *G*, we may infer a repulsive force emanating from *G* to act on *S*.

Lewin's favourite and typical case is that of a hungry child attracted towards a piece of candy. Since the child moves towards the candy, it is clear (on Galileian principles) that an attractive force goes out from the candy *(G)* and pulls the child *(S)* towards *G*. The dynamic problem, then, is to state the nature and origin and direction of this force. The fact that the candy can thus attract the child is conveniently and more abstractly described by saying that the candy has a positive *valence* for the child, (or, in general terms, *G* has a positive *valence* for *S*). The problem may then be dealt with at this higher level of abstraction by asking—How does *G* acquire the *valence?*

The typical case of the child and the candy suggests at once the answer. For we observe that the candy does not always attract the child. The child, if it is gorged with candy, may move away from, instead of towards, the latter; in this case the candy repells the child; and it is clear that *G* sends out now a force of repulsion which pushes *S* away. *G* must be recognized as having under these circumstances a negative *valence*. The *valence* of *G* for *S* varies, then, with the state of *S*. When the child is hungry, the candy has a positive *valence;* and when it is gorged, the *valence* of the candy is negative. Further, the one piece of candy may attract one child and repell another; that is to say it may have positive *valence* for the one *S* and negative *valence* for the other, sending out at the same time the two

different forces (or vectors), the one of attraction, the other of repulsion. Now the hunger of the child may be described as a need for food; and the child's state of engorgement may be described as a need to get away from food. And, in every instance of behaviour, we seem able to infer that the behaviour expresses some need of the creature. Hence it is said that the child's hunger-need *endows* the piece of candy with positive *valence;* its need to get away from food (due to engorgement) *endows* the candy with negative *valence;*[5] and, in general, in so far as any object possesses *valence,* positive or negative, it has been *endowed* with that *valence* by some *need* of the organism.

One more feature of the formula requires mention, namely *tension.* The one need, say hunger, seems to vary in respect of its valence-endowing power. Thus the hungry child may pass by the candy without seeing it, intent on some other activity; but if and when he sees it, the hunger-need seems to be intensified, a fact Lewin expresses by saying that a *tension* (or a state of tension) is set up in the *need.*[6]

We have, then, the full formula in concise form as follows: *Every action is a movement of* S *towards (or away from)* G; *the movement of* S *is caused by a force of attraction (or repulsion) emanating from* G, *and sent out, from* G *to* S, *by a valence possessed by* G. G *is endowed with this valence by a need of* S *in a state of tension; and* G *continues to possess the valence (or the valence operates) only so long as the tension persists in the need and with a strength proportional to the intensity of the tension in the need.*

Now, if this formula were put forward as one to be taken literally, its purely fictional character would be obvious. But Lewin does not ask us to take it literally. The candy *(G)* is not the physical candy, and the child *(S),* which is pulled towards *G,* is not the bodily physical child; hence the force which pulls *S* towards *G* is not one

[5] Lewin goes further and formulates the generalization that valences not only come and go with needs but also that the strength of the valence varies with the intensity of the need. This is called by Koffka (*Principles of Gestalt Psychology,* New York, 1935, p. 345) "Lewin's theory of the reciprocal relation between needs and demand characters." Surely, a delicious manifestation of that excessive loyalty of one G. P. to another of which I made complaint in the first article of this series!

[6] But the same word 'tension' is used in a different sense, as on page 134, where we read: "The degree of tension in the field [not in the need, be it noticed] depends obviously upon the strength of the negative valences of punishment, task and behavior." And in a footnote we are told: "As a dynamic concept, tension is defined as oppositely directed vectors."

operating between the physical candy and the physical child. Hence, it seems clear that the *valence* is not a property of the physical candy; but whether the need is (in Lewin's view) a need of the physical child, it is not easy to say.

In what world, or realm, do, then, these things and processes occur? The answer is "in the psychological field." It is true that *valences* are said to be "among the most important properties of the environment," and *valences* are said to *operate* and to be *causes* of activities and movements of objects in the environment. But such expressions must not mislead us. It is not the physical, but the psychological, environment that is meant. Now, what exactly Lewin means by psychological environment is a very difficult question; one far beyond my powers; a question decidedly more difficult than the corresponding questions raised by Koffka's expressions *behavioural field* and *environment*. Roughly, I take it, Lewin and Koffka use "psychological field" in much the same sense; and both divide it into two principal parts, the Ego and the environment. But that is as far as I dare venture.

Perhaps the most definite statement is the following: "In work and play, in expression, action, emotion—everywhere the actual occurrence is conditioned by the present structure of the environment. By environment is here meant not only the momentary situation in the narrower sense of the word but also the inclusive psychological life-space ordinarily referred to as milieu. The task of scientifically representing the psychological environment is thus of fundamental significance. It is especially so for the most important problem of psychology, namely, the explanation of psychological dynamics" (p. 117). From this one might infer that by 'the psychological environment' is meant the environment in so far as it appears to and is known by, or conceived by, the subject. But this will not do.

The difficulty may be illustrated, if not illuminated, by citing one or two passages: "Beside the quasi-physical and quasi-social environment, a mental task or a phantasy must sometimes be characterized from the dynamic point of view as environment" (p. 76). From which it seems clear that some things, such as tasks and phantasies, may shift about from one part of the field to another, may belong at times to the environment and at other times not. Yet it would seem that, for the child, phantasies belong wholly to the environment: for "the description of the child's environment would be incomplete with-

out including the whole world of phantasy" (p. 76). Again: "Every fact that exists psycho-biologically must have a position in this field [the psychological field] and only facts that have such position have dynamic effects (are causes of events). The environment is for all of its properties (directions, distances, etc.), to be defined not physically but psycho-biologically, that is according to its quasi-physical, quasi-social, and quasi-mental structure" (p. 79).

One cannot say that the psychological field, or the environmental part of it, is the field of consciousness at any moment; it is far more comprehensive than that. Perhaps it may be defined as the total of knowledge, acquaintance and imagination (past and potential) possessed by the subject. And yet this hardly seems to cover tasks. To state Lewin's doctrine of the psychological field and its contents or components is, as I said, more difficult even than in the case of Koffka's parallel doctrine: and for a good reason; namely, whereas Koffka seems to try very hard to make his doctrine clear, Lewin hedges deliberately as a matter of policy. It might be argued that, since the things and forces which make up his psychological field are not the physical organism and the physical environment, they must be either cerebral facts or psychic facts, or psycho-physical facts, or some cerebral and some psychic. But Lewin refuses to commit himself. "When the concept of energy is used here [*i.e.*, in describing the 'structure of the mind,' 'the psychological field' and the activities within it] and when later those of force, of tension, of system, and others are employed, the question may be left quite open as to whether or not one should ultimately go back to physical forces or energies. In any event, these concepts are, in my opinion, general logical fundamental concepts of all dynamics" (p. 46). In short, in this formula and method, everything is quasi, quasi-physical, quasi-psychical, quasi-social, or quasi-mental. Yet we read: "It must always be kept in mind that we have to do with forces in a *psychical* field and not in the physical environment."

In spite of, or perhaps in virtue of, this intentional ambiguity of all its terms, Lewin's formula for dynamic explanation of all instances of behaviour has a seductive quality. It does lend itself most conveniently to 'explanation' of many forms of behaviour and, perhaps, may justify itself by its extreme pliability and convenience.

One illustration of such convenience may be mentioned since it figures prominently in the writings of Lewin and his pupils. Physical barriers which bar the route of S towards G are in some respects

analogous to moral and intellectual barriers, such as social prohibitions and intellectual puzzles which must be solved before the goal can be reached. Lewin's method permits all barriers, physical, moral, and social alike, to be treated in the same fashion; for all take their quasi-places in the psychological field and exert in it their quasi-forces. Especially, it facilitates the shelving, postponement, or evasion of the necessity to face the problem presented by the goal-seeking, purposive, or teleological appearance of human and animal actions. And, since we cannot stop at every instance of behaviour to struggle with this tormenting problem, it may be wise policy to adopt a mode of speaking and thinking which allows us to offer 'explanations' without raising that problem.[7]

We have to enquire whether these seductive advantages of the formula are outweighed (1) by limitations of its applicability; (2) by its very marked tendency to disguise or hide away from view the real problems, and to postpone all real understanding and explanation, leading us to be content with quasi-understanding and quasi-explanation of quasi-problems presented by quasi-objects and their quasi-activities.

Limitations of Application of Lewin's Formula

First, then, as to limitations of applicability. So long as action consists in approach of *S* toward *G*, or in retreat from *G* in a straight line, the formula is applicable. But of course behaviour is not always

[7] That these attractions or advantages are very real is shown in general by the very considerable following which Lewin's fictional dynamics have secured, and in particular by the adoption of them by Dr. E. S. Russell, one of the keenest students of animal behaviour and one of the most philosophical, open-minded and enlightened of biologists. In two recent articles he has frankly espoused Lewin's formula and shown how very convenient it proves in interpreting various forms of animal behaviour ("Valence and Attention in Animal Behaviour," *Acta Biotheoretica*, Series A, Vol. I, Pts. 1-2, Leiden, 1935, and "Playing with a Dog," *Quart. Rev. Biol.*, 1936, XI). The method obviously lends itself most readily to all the many instances of 'homing' behaviour in animals, where the home, the nest, lair, or hive is the goal-object and the behaviour to be explained consists essentially in movement towards or away from the home. One might favourably compare Lewin's formula with the only serious effort hitherto made to explain such behaviour in strictly mechanistic terms; namely, that of A. Bethe. (The theory is stated and discussed at some length in my *Outline of Psychology*.) Bethe finds himself driven to postulate a mysterious unknown physical force which radiates from the hive (in the case of the honey-bee) and acts tropistically upon the bee to guide its motion towards or away from the hive; the bee being positively tropic when laden with honey, and negatively tropic to this force when unladen. In the case of this theory a multitude of observations and experiments conclusively prove that no such force is concerned. But Lewin's things and forces, having been located in a sort of shadow world of ambiguous nature, a world wholly inaccessible to observation, no such refutation of the theory is possible.

so simple. Adults and even children and animals sometimes go sideways, move tangentially to the sphere of *valence,* or move in a circle round the valent object *G*. Lewin deals explicitly with such cases under the head of conflict situations. Suppose the hungry child, *S,* in the presence of a piece of candy *G*, which candy he has been forbidden under threat of severe penalties to approach. *S* has then two needs; one of these, the hunger-need, endows *G* with a positive valence; while the other, the need to avoid punishment, endows the same *G* with a negative valence. The one valence operates on *S* with a force of attraction, the other with a force of repulsion. If these two forces are equal as well as opposite, *S* must remain at rest neither approaching nor retreating; and if either is stronger than the other, *S* must move at reduced speed towards or away from *G*. Now as a matter of experimental fact, a child under these conditions, is apt to circulate round about the attracting object. How does Lewin apply his formula to instances of behaviour of this sort? He resorts to allowing one of his two opposed forces or vectors to alter slightly its direction so that the two are no longer exactly opposite in direction; a lateral component ("a very strong resultant perpendicular is the direction punishment-task") ("a strong sideways resultant of the two vectors," p. 92), at once results sufficient to drive the child laterally or tangentially to the sphere of attraction, or to keep it circulating around *G*.

Now this adroit shifting of the direction of one vector in order to obtain a lateral component is a bit of sleight of hand. It is strictly against the rules of the game. According to the Galileian rules the forces of attraction and repulsion acting between two objects must be assumed to act along the straight line joining those two objects. But, of course, it may be that, in a world of quasi-things and quasi-forces, the laws (being only quasi-laws) are less strict or are less faithfully observed.[8]

[8] Lewin distinguishes three types of conflict-behavior. The first type (the one for which this illegitimate explanation is actually offered) consists in lateral movements when *S* stands between a repulsive task (G_1) and an equally repulsive threat (G_2) of punishment for avoidance of the task. E. C. Tolman having pointed to the illegitimate nature of this explanation ("Lewin's Concept of Vectors," *J. Gen. Psychol.,* 1932, VII, 3-15), Lewin attempted an elaborate justification (*J. Gen. Psychol.,* 1933, VIII, 318-344). The attempt seems to me entirely unsuccessful. If the reader will look at the figure 14 (page 341) of that article, he will see that the ingenious appearance of success is achieved only by another illegitimate assumption, namely that the threat of punishment (G_2) which sends a vector thrusting towards (G_1) may be represented as occupying a fixed position in the field; whereas, of course, the threat has no fixed position and its vector must be represented as always and only pushing the child directly toward (G_1) so that no lateral

Another type of behaviour one degree less simple than direct approach toward, or retreat from *G*, is the *Umweg* (the round-about route). The *Umweg* behaviour is that of a creature which, striving toward a goal-object and finding his direct route to it blocked by an insurmountable barrier, goes round about the obstacle to reach his goal.

The case Lewin deals with is the case of a U-shaped barrier enclosing the creature on three sides, open only on the side remote from the goal. Now most children and many animals will, on finding themselves in this situation, immediately retreat from *G* until, by moving laterally, they circumvent the barrier and can again approach *G*. That is to say, *S*, in approaching *G*, describes a U-shaped path, one limb of which (the first part) leads away from *G*, rather than toward *G*.

Lewin deals specifically with this case (p. 83). The problem is—Can the simple attractive force or vector proceeding from *G* to *S* cause the preliminary retreat of *S* from *G*? Lewin's solution of this problem is to say that the U-shaped path becomes for the child the path of approach to the goal, and that the limb of it leading away from *G* then means for him the first part of this path of approach. "The initial part of the route, which objectively is still a movement away from the goal, thereby loses psychologically that character and becomes the first phase of a general movement toward the goal" (p. 83).[9]

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component may be assumed. The case mentioned in the text above (Lewin's third type of conflict) he promises on page 123 to deal with later. But when, on page 158, he comes to deal with it, he can only say that the child "strives to escape by all available methods." This, of course, is to throw up the attempt to apply the formula, to cast aside all vectors and valences, and to talk in terms of psychology. It is, perhaps, a more serious reproach to Lewin's method that it misleads him into the perpetuation of an old and very grave pedagogical error; namely, the error of assuming (throughout his long chapter on *Reward and Punishment*) that a child's obedience and docility toward his parent or teacher is chiefly or wholly a matter of avoidance of punishments threatened or implied, or at best proceeds also from the hope of rewards. See page 132 where it is said: "This dependence may go so far that special threats of punishment are unnecessary." Which, taken in its context, clearly means that the obedient child lives so habitually surrounded by an atmosphere of implied punishments that he has no possibility of escaping these multitudinous vectors, these many sharp arrows all directed at his posterior and driving him on to his tasks. This is to misunderstand entirely the essential nature of docility, the rôle of suggestion and the working of personal influences on the moral development of the child, a vastly important world of influences utterly recalcitrant to Lewin's quasi-mechanical methods of interpretation.

[9] The case is so crucial that I cite a fuller treatment of it from an article by Lewin (*J. Gen. Psychol., ibid.*): "The difficulty of the roundabout route for a child behind a U-formed barrier no longer exists for an older child if he has enough of a survey of the situation: the first part of the roundabout route for the older child

Here we see again that Lewin, when confronted with an instance of purposive action one degree less simple than direct approach toward, or retreat from, a goal-object, at once throws overboard his dynamic formula, his whole system of quasi-physical Galileian explanation in terms of vectors and valencies pulling or pushing *S* toward, or away from, *G*, and resorts to psychology. Behaviour of this first degree of complexity is no longer treated by him as merely being pulled towards, or pushed away, from *G*; rather, he recognizes it for what it appears to be (to all unbiased obsevers) namely, a striving towards a goal directed by the *meaning* the subject finds in the things about him. Thereupon the problem of purposive activity confronts us, naked, unashamed and unresolved.

In his reply to Tolman's criticism of his use of vectors, Lewin actually mixes together in one sentence (which is offered as explanation of *Umweg* behaviour) vectors and meanings. Now, in certain forms of literature, fact and fancy may be blended with excellent effect; but I suggest that Galileian vectors and psychic meanings (belonging as they do to two different universes of discourse) should not be mixed in one dynamic explanation; for they refuse to blend in one harmonious Gestalt.

Consider Lewin's explanation in the case of a real behaviour problem. It is found that young delinquents confined in a 'home' will in many cases break out and escape shortly before the date of termination of their prescribed period of detention, even though they have been well-behaved up to that time. Lewin's explanation is as follows (p. 88): The boundary of the home is a 'barrier' between *S* and his goal of freedom which lies beyond the barrier. The freedom has a positive valence and therefore a vector draws *S* in that direction. The barrier (which is in part physical and in part social, a barrier of prohibition) like all barriers, sends a vector in the opposite direction; which vector, during the earlier part of the detention period, suffices to counteract the positive vector from *G* (the goal of

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has then no longer the character of a route *away* from the goal (as for the younger child), but *to* the goal" . . . Therefore the first part, m, of the path "which first was a path away from the goal, is now a part of the path p." Thus: "the path m has now psychologically the meaning of the first part of the whole path p." Further: "The direction m is psychologically no longer a direction away from the goal but toward it. Therefore, the direction of the psychological *force* to the goal is then to be characterized as the direction of m, and *the child is moving in the direction of this force to the goal in accordance with our basic theory about the connection between locomotion and forces*" (p. 338). I italicize one sentence and abstain from further comment.

freedom). "Now that his discharge is approaching, the longed-for, but until now uncertain, world of freedom is just ahead. The boundary of the home thereby acquires in much greater degree the character of a marked barrier which separates the youth from his almost attained goal. *Hence the home acquires a pronounced negative valence*" (p. 88).

Now, if we grant the validity of Lewin's formula for this case, is this explanation consistent with the premises? The principal effect of the approach of the time set for release is said to be that "the boundary of the home acquires in much greater degree the character of a marked barrier"; from which it follows that its negative *valence* is increased; and, therefore, the negative vector (opposed to that drawing *S* towards freedom) is made stronger. From which it should follow that escape is more difficult and improbable than in the earlier part of the detention-period. But Lewin adroitly introduces (with the word 'hence,' which has no faintest justification) a new *valence* and a third vector; namely, the 'home' is now 'endowed' for the first time with a negative *valence,* from which proceeds a vector thrusting *S* towards freedom, i.e., out of the home.

It is true that on an earlier page Lewin has written: "Fajans has shown that, other things being equal, the strength of a valence increases with its apparent proximity [either in space or time seemingly] at least in certain cases." He might, then, have been content to say that, with the approach in time to freedom, the positive *valence* of freedom increases in strength and sends out a stronger vector to drag *S* out of the 'home' overcoming the negative vector proceeding from its boundary. But this plausible solution was not open to him, because, as he honestly states on the same page (p. 88): "The experiments of Fajans show that the restraining forces corresponding to the barrier increase when the strength of the valence behind the barrier is increased."

Lewin's proffered explanation is then a pseudo-explanation, acceptable only to readers insufficiently alert to detect the skilful introduction of the new and illegitimate third vector. There is nothing in the premises or the reasoning to justify the statement: "*Hence* the home acquires a pronounced negative valence."[10]

[10] A plausible explanation of the facts in terms of psychology seems not far to seek. Suppose that our delinquent, condemned to incarceration for twelve months, has a strong sentiment of love or liking for his home, from which sentiment springs recurrently the desire to return to his home. During the early period of his detention, he suppresses as far as possible his baffled desire, and, occupied in

Of our small selection of Lewin's many Galileian explanations (all illustrated with topological diagrams), all turn out on close examination to be pseudo-explanations—even when his premises are granted. The instances chosen for such examination are among the simplest of all. It does not seem probable that similar examination of his many more complex instances (in which in place of one or two vectors, his diagrams exhibit as many as ten or more) would justify a more favourable verdict.

Consider for a moment a simple instance of purposive behaviour to which Lewin frequently returns. You write a letter, seal, stamp and address the envelope. You need to mail it; a tension arises within your need; you think of the mail-box at the corner of your block. At once the tension endows the mail-box with a positive valence. The positive valence sends out to you from the box a vector which hauls you out of your room, down the stairs, out of the front door, along the street to the box. You deposit your letter; and lo! at once the valence and the vector disappear as magically as they came. The facts thus described by Lewin seem to fill him with wonder and even awe. And well they may. They are uncanny. He also seems to feel that his description is the report of a great discovery. Put into less mythical language, the fact with which he is so much concerned is merely that when you have mailed your letter you no longer desire to mail it. The valence of the mail-box is merely a very simple and ordinary instance of a means desired as a step towards a goal desired for itself.

Vary the story slightly and suppose that, having made your letter ready for mailing, you cannot remember the position of any mail-box. That is the kind of situation with which purposive action has very commonly to deal. Yet Lewin's valences and vectors are now utterly inapplicable. The fact is that his theory of action has a vague plausibility in the simplest of all forms of purposive action, the case of a greedy little boy grabbing a piece of candy; but breaks down hopelessly at the slightest complication. Even if you grant the vector drawing you to the mail-box, you still have to explain the

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adjusting himself to his new surroundings, the thought of home does not much trouble him; he succeeds in dismissing it when it at times recurs. But as the time for return home draws near, his mind 'dwells' upon the thought, the sentiment springs into stronger, because frequently renewed, activity; the desire is thus strengthened and leads to action. Also one may fairly assume, as a subsidiary factor, that the irksomeness of detention grows more pronounced with its prolongation.

purposeful manipulation of the letter which deposits it in the box. And, even if Lewin's assumptions be correct, we are probably separated from any Galileian explanation of such manipulation by at least a thousand years of intensive research.

Let us return to our bird migrating from England to Africa, as offering one important and much discussed type of animal behaviour. At first sight the formula seems to solve the problem readily enough.

The bird has a need to migrate. At a certain season a tension arises in this need. The tension endows Africa (or some spot or area in Africa) with a positive valence. The valence sends out a force of attraction which operates upon the bird and hauls it over to Africa, willy-nilly. What could be simpler or more complete? And yet is the great problem of bird-migration really solved by this Galileian explanation? Must we not, after all, fall back on the Aristotelian method?

As a last example of the insufficiency of the formula, consider the simple case of the child who becomes gorged with candy, and thereupon is no longer attracted, but is repelled, by any new piece of candy. Here the valence of the candy is reversed (changed from positive to negative) by the gorging of the child; just as, in Bethe's theory, the sign of the tropism of the bee is reversed when the bee becomes gorged with honey. But how the sign of the valence is reversed Lewin's system is as little able to explain in any sense as Bethe's theory in the case of his super-hypothetical tropism. All he can say is that a new need somehow springs into being; or that a tension arises in another need, a pre-existing need to retreat. The instance serves to emphasize the all-importance of *needs*, and the fact that unless and until we can gain, by biological or Aristotelian methods, some understanding of *needs*, Lewin's formula hangs in the air without foundation.

Does Lewin's Dynamic Formula Explain?

Turn now to the second question regarding Lewin's universal formula—Does it explain? And let us consider the question in relation to the most favourable simple instances of behaviour, namely, those consisting in simple approach of *S* to *G*, or, retreat of *S* from *G*.

Let us first grant the valence of *G*, and the force or vector[11] proceeding from *G* to act upon *S*, drawing it towards *G* or thrusting

[11] Lewin's preference for the term *vector* is but one illustration among many of his consistent preference for the more abstract terms over the less abstract. A

it in the opposite direction; all these having their being in *the psychological field.* In any such case of approach of *S* toward *G,* before we can accept the proffered explanation as such, we must receive from Lewin satisfactory answers to several questions, namely: (1) How does the need in *S* (i.e., a tension in a need of the ego-part of the psychological field) endow the object *G* with valence, i.e., with the power to send out an attractive force or vector to draw *S* towards *G* (in the psychological field)?[12] (2) How does the force emanating from *G* find *S*? Some passages suggest that the valence does not merely send out the force or vector which acts on *S,* but creates a field of attractive force all around *G.* (3) Since the force of attraction pulls *S* toward *G,* it must (on Galileian principles) also pull *G* toward *S.* Why then does not *G* move toward *S* (like moon and earth)? Is it that *S* is the only mobile part of the psychological field? Is *S* the only thing or object in the field which is free to move, all other objects being firmly rooted in their own positions in the field? (4) Are we to believe that *S* does actually move towards *G* in the field? Is it a real locomotion of *S,* or merely a quasi-movement of *S* which is caused by the force? (5) If it is a real locomotion of *S,* what is it that moves toward *G,* from the position occupied by *S* in the field? We are told that the ego is a system and a highly complex system. It is, then, presumably this complex ego-system

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force we are told (p. 81) "is defined through three properties: (1) direction, (2) strength, (3) point of application. The first and second properties are to be represented through the mathematical concept vector." Accordingly, various 'solutions' of behaviour-problems in terms of the dynamic formula are illustrated by diagrams in each of which a line or arrow, impinging on *S* in the direction of *G,* represents each vector. We are told that "the point of application is indicated in the figures, (as is the custom in physics) by the point of the arrow." Why then are these arrows called 'vectors,' since vectors are defined as forces considered in abstraction from their points of application. There would seem to be three reasons, motives or *vectors* at work. First, by calling the arrows *'vectors'* rather than 'forces,' one evades the embarassing question—Just where is the force emanating from *G* applied to the subject, *S*? Where does it impinge upon *S*?—A question apt to be embarassing in the case of the non-physical quasi-subject of *the psychological field.* Secondly, since it is 'the custom in physics' to speak of vectors, the term serves to emphasize the Galileian character of the explanations offered. Thirdly, Lewin has conceived the ambition to create a new science, a topology of behaviour. "One can characterize these possible and not possible psycho-dynamic locomotions (quasi-bodily, quasi-social, and quasi-mental locomotions) at every point of the environment with the help of the concept of topology, which is a nonquantitative discipline about the possible kinds of connections between 'spaces' and their parts" (p. 80).

[12] In order to effect this all important step in the dynamic process, the need of *S* (or the tension in it) must operate on *G* with some force or forces in order to create in it (*endow G* with) the valence which is to send out the attractive force to *S.*

which moves through the psychological field under the influence of the attractive force. (6) Above all—What is the *need* in *S* in which arises the tension which endows *G* with the valence which sends out the force which draws *S* towards G?

If the answer to all the foregoing questions is to the effect that all these things and forces are quasi-things and quasi-forces, we surely cannot be content with the same answer in respect of the *need;* for the *need* is the main root of all the dynamic explanation! If the need is not something real, but only quasi, then the whole scheme of dynamic explanation also is only quasi.

(7) Suppose we waive the demand for answers to all these questions. We nevertheless still need an answer to a final question. Granted all the things and processes postulated in *the psychological field* (whether real, or only quasi, things and forces and processes) how do these occurrences in *the psychological field* explain the actual movement of the real *S* towards the physical *G*, the bodily locomotion of the child toward the candy? To this last question (unlike all the six preceding questions, in this respect) Lewin does give some slight suggestion of an answer; and, in fact, of two answers. Let us see if either seems satisfactory. The one answer closely resembles the answer given by Koffka to the same question—How do all the postulated processes of the psychological field lead to innervation of the appropriate muscles and thus to actual bodily movements? Koffka's answer, as we have seen, is that the field obtains control over *the executive.* Lewin's answer is that the field "obtains control of the *motorium*"; also that valences "operate at the same time (as do certain other experiences) as field forces in the sense that they steer the psychical processes, above all the motorium" (p. 51).[18] In neither case is there made the faintest attempt to throw light upon this all-important process of obtaining control of the innervation system.

The second answer vaguely indicated is the principle of *isomorphism.* Lewin hardly mentions this. Yet we are assured that "the fundamental ideas of Gestalt theory are the foundation of all our investigations in the field of the will, of affection, and of the personality" (p. 240). And, as Koffka has shown so clearly, *isomorphism* is a very fundamental idea of Gestalt theory. Lewin is therefore

[18] This passage is intriguing in that it suggests that a *valence* is an experience, and that the motorium is a psychical process. Where so much is obscure, we gladly seize on such hints.

entitled to all the help it can give. If, then, *isomorphism* is regarded as a well-established principle, Lewin may claim that, if he has explained movement of *S* towards *G* in the psychological field, *isomorphism* will give all the rest of the required dynamic explanation; or, more fully, if the valences and vectors explain the movement of *S* toward *G* in the psychic or conscious field, then the principle of *isomorphism* insures, first, a corresponding movement in the cortex of the brain of *S;* secondly, a corresponding movement of the bodily organism of *S* toward the physical goal-object *G*. But, as we shall see presently, the principle of isomorphism is of extremely questionable validity; and, even if it be granted, or if it could be empirically validated by inductive generalization, it would still remain absolutely unintelligible, and would have no right to a rôle in any Galileian system of explanation.

Yet another step of the explanation of action, the necessary first step, is conspicuous by its absence from Lewin's system; namely, the explanation of the rôle played by cognition in initiating the train of events which constitute behaviour. Thus the hungry child comes within view of the candy, and at once perceives it, recognizing it. This I say is the essential first step; for, if the child does not recognize the candy as candy, he does not notice it, or at least passes it by, is not attracted by it. Cognition, then (or, in this case, perceptual recognition), is the process which sets up the tension in the need, which in turn acts on the goal-object to endow it with the *valence* which in turn emits the vector which causes the child to approach the candy.

On this first and all-important step of the whole cycle of processes Lewin's comment is laconic: "The particular processes by which the sight of the chocolate causes the behaviour cannot here be discussed in detail."

Summing Up Lewin's Formula

Positively, this doubly fictitious and misleading doctrine of vectors and valences is the main substance of Lewin's much lauded contribution to the understanding of action. Koffka adopts it wholeheartedly (it is the fifth limb to his newt which I mentioned above). He even speaks of "Lewin's theory of the reciprocity of a need and a demand character"; the theory in question being that the strength of the vector proceeding from a valence (or demand-character)

varies directly with the magnitude of the tension of the need.[14] The situation would be ludicrous were it not so symptomatic. The *façon de parler* which puts the valence in the desired object is not even new. It has been the common practice of philosophers ever since they began to discuss valuation as such; the difference being that the tertiary quality of the object created by the desire or aversion of the subject they have commonly called 'value' rather than 'valence.'

Koffka is displaying here that excessive sectarian loyalty to which reference was made in Part I of this article. Also it is possible that he is uneasily aware of the thinness of his own contribution to the understanding of the energies and forces which are at work in producing behaviour. Even so, he would do better to abide by his own doctrine; namely, that the psychological field *somehow* (without the intervention of such pure fictions as Lewin's *valences* and such quasi-forces as his vectors) "gets control of the executive" and thus attains its goals (or should it be—the goals of the organism?). This, the Koffka formula, however scanty the illumination it sheds, has nevertheless the merit of being in some sense true, a bare statement of fact: it is neither a gratuitous mystification, nor a merely quasi-dynamic pseudo-explanation.

Why then has this 'theory' of Lewin's excited so much enthusiasm? The answer falls under several heads.

First, like Köhler, Lewin opens his discussions with an effective *exposé* of the total inadequacy of *connectionism* in all of its forms, assuming at the same time that the whole world is given up to *connectionism* and that he appears as the first deliverer from its absurdities.[15]

Secondly, he puts his *exposé* in very simple language: *"Connections are never causes of events,* wherever and in whatever form they may occur" (p. 45). Lewin goes on to say that liberation of energy or energies must be postulated in every case. "In order that a process occur, energy capable of doing work must be set free. One must therefore inquire of every psychical event whence the causal energies come." To minds grown dim in gazing upon *S-R* bonds

[14] "The valence of environmental objects and the needs of the individual are correlative" (p. 78).

[15] "The relations to which theory has *heretofore* [i.e., up to the year 1928] looked in experimental psychology, when seeking the causes of a psychological event, belong *almost exclusively* [italics mine] to one quite specific type of relation. This is a real connection which one may designate as *adhesion* of any sort of object or collection of objects or processes . . . this adhesion is regarded as the cause of the course of the event" (p. 43).

these truisms seem, no doubt, refreshing as rain upon the desert's dusty face; and they constitute an undeniable merit of Lewin's exposition.

Yet, when we search for any contributions by Lewin to this enquiry for causal energies, we find merely the same answer which we found in Koffka's pages: namely, there are systems and there are needs (whether these are synonymous terms remains in both cases obscure) which are reservoirs of energy; in these systems and needs tensions arise from time to time and discharge themselves as best they may, and, in doing so, achieve all the miracles of human art and science.

But the feature of Lewin's system which is chiefly responsible for its seductiveness to so many persons is, at the same time, its principal vice; namely, it seems, to those who do not look below the surface, to offer purely mechanistic or Galileian explanations of behaviour processes which have all the appearance and marks of goal-seeking, of purposive activity, of being truly teleological; and thus, to such persons, they seem to obviate this most obstinate bugbear, the seemingly purposive or teleological nature of behaviour. The hungry child presses towards the food, overcoming or evading, perhaps by means of the most complicated processes, bodily and mental, all barriers, restraints and difficulties, physical and moral, just as though he were really striving toward the food as his goal. Now comes Lewin and tells us that the child is not really striving toward the goal; that, in spite of all such appearance of purpose, in reality the child is pulled toward the goal; and the whole of behaviour is made to seem mechanistically explicable by aid of his magic formula.

On the question of the reality of teleological activity Lewin carefully avoids all explicit expression. He does not say, and he refuses to say, that this behaviour (or any other) is either purposive or mechanistic, or that his own 'explanation' is one or the other. Rather, he manages to suggest that his own 'explanations' are of a third type, vastly superior to both the mechanistic and the purposive or teleological.

We have such statements as: "Those processes which make an especially goal-striving impression are usually characterized dynamically by a reference to a positive valence" (p. 81). And: "The behaviour thus makes a pronounced goal-seeking impression. A natural teleology reigns" (p. 120). And in the last essay of the

volume,[16] Lewin uses frequently such words as 'purposes,' 'intentions,' 'goals.' Yet he also makes it clear that in all such cases 'the goal-striving impression' is always in his view illusory. But this topic must be further discussed in the fourth and last part of this article.[16a]

Lewin's Account of Personality and the Structure of the Mind

We have seen that Koffka arranges his needs in a sort of psychic onion, which he calls the ego. Lewin's account differs in that he sketches the structure of the soul, not of the ego, after the pattern of a basket of potatoes. Each potato represents a need or system. And souls differ from one another in two ways (this is Lewin's theory of personality); namely, in some the potatoes are more numerous than in others, and in some they have thinner skins. At the bottom of the human scale are personalities with few potatoes having very thick skins; at the upper end are those having many potatoes with very thin skins.

Koffka's psychic onion seems to be an attempt to improve upon this potato-basket scheme. For he writes: "Our modern psychology owes this conception of the complex character of the Ego to Lewin" (*op. cit.*, p. 333). And he even adds the date of this epoch-making discovery, namely, 1926. Another instance, of course, of the sacri-

[16] *Op. cit.*

[16a] It has been suggested to me that it is not fair to represent Lewin's dynamic formula as assuming that the force which acts on the subject S to cause its motion towards or away from the goal-object G is sent out from, or emanates from the object, or from the valence possessed by the object. But that is the very essence of his explanation. It is that and that alone which takes away the purposive nature of the subject's striving and makes Lewin's explanation a mechanical or Galileian one. And in order that there may be no question as to the fairness of my rendering of his formula I cite the following passages: "That the valence is not associated merely with a subjective experience of direction, but that a directed force, determinative of the behavior, must be ascribed to it, may be seen in the fact that a change in the position of the attractive object brings about . . . a change in the direction of the child's movements" (p. 81). "The strength of the field *force going out from a valence* depends also upon the position of the valence relative to the individual . . ." (p. 85). "Valences of this sort operate . . . as field forces" (p. 51). "Certain activities, caused in part by valences" (p. 51). "Thus a vector (V_r) in the sense of a thrust away from the task operates upon the child" (p. 120). "A vector in the direction of the goal constantly arises and initiates the corresponding behavior" (p. 120). And the following sentence shows clearly that the valence and the vector are invoked to explain away all appearance of purposive action of goal-seeking: "What is ordinarily designated as teleology and taken as the criterion of the behavior of living beings is in large part nothing other than an expression of the following fact: a positive valence controls the situation in such a way that with changes in the position of the person the direction of the field forces changes in the manner just described" (p. 120).

fice of truth to sectarian loyalty. Did not William James expound the complexities and manifoldnesses of the self in a much celebrated chapter? One can only suppose that it has escaped the notice of the G. P's.

I well remember that my first acquaintance with Lewin's writing was the reading of the article to which Koffka here refers.[17] Finding in it something like a crude adumbration or, rather, reflection of my account of the sentiments (a vastly complex system of dispositions which supply most of the energies of human activities), and of the self as comprising a vastly complex system of such sentiments, I was interested, and said to myself: "If this man has achieved this account quite independently, there's something to him." But, having since found in Lewin's writings at least one footnote reference to my *Social Psychology* (in which book the system of the sentiments and especially the complexities of the self-sentiment were expounded at some length in the year 1908). I am now disposed rather to complain (perhaps unjustly) that Lewin (far from having discovered the complexities of the Ego, as Koffka asserts him to have done) has produced merely a bungled caricature of my system, without adding to it by one jot.

How utterly thin and hopelessly inadequate is this 'theory of personality,' and how undynamical! All the multitude of personal peculiarities (all the varieties of disposition such as the timid, the fastidious, the pugnacious, the enquiring, the lustful or the gluttonous; all the varieties of temperament and temper, such as the excitable and the placid, the introvert and the extrovert, the hopeful, the steadfast, the fickle and the mercurial; all the types of character and the varieties of intellect from the idiot to all the special forms of talent and genius) all this vast variety of human qualities Lewin's theory requires us to interpret in terms of his basket of potatoes, one differing from another merely in respect of size, position in the group, and thickness of its skin.

After all criticism, there remains to Lewin's system of dynamic explanation one great merit; namely, it does recognize the one fundamental truth from which all dynamic explanation of behaviour and of mental activity must set out, the real existence within the organism of certain great springs of energy, the energies liberated from which are the principal, if not the sole, driving or motivating energies of all behaviour and all mental activities. This is the fun-

[17] "Vorsatz, Wille und Bedürfniss," *Psychol. Forsch.*, 1926, Bd. 7.

damental truth on which the hormic psychology builds up its system of dynamic explanation of mental life and behaviour. These springs or sources from which the activating or motivating energies are liberated, Lewin speaks of as 'reservoirs of energy'—a term I also have tentatively used, recognizing that each such source may perhaps be more properly regarded as a transformer rather than as a reservoir of energy. And it is a further merit that he gives vague indications of recognizing that some of these sources or reservoirs of energy, these "relatively segregated psychical energetic systems" (which he calls *needs*) are given in the innate constitution and may be regarded as primary, while others are secondary in the sense that they are developed in some way out of the former in the course of ontogenesis. "Changes clearly of the types of development, of maturation, of growth, and of regulation play a great rôle. This holds hardly less of the psychical energy sources also, for example, of the psychical needs. The needs show a marked ontogenesis. This is true not only specifically, of such needs as the sexual, but also generally" (p. 63).

Lewin has expressed a hankering after a topological psychology. A book by him on that topic has been announced, but is not accessible at the time of writing. At present I can only say that its aim would seem to be to treat all psychological facts and processes in terms which can be translated readily into two-dimensional diagrams on a blackboard. We have seen how this aim has already misled Lewin into a system of pseudo-dynamical explanations, and it is, I think, largely responsible for the poverty-stricken inadequacy of his theory of personality.

NEWS AND NOTES

Critical Comment

Autism in Rorschach Scoring: A Feeling Comment

In a recent communication reporting an experiment with the Rorschach test among Moroccans,[1] the authors, after describing the usual procedures in evaluating and scoring test responses, add, "and last, but not least, it is important that the experimenter should not allow himself to be guided merely by a stereotype classification of responses but should rather *'feel himself into'* every single one."

It is this phrase, "feel himself into"— the italics are mine—and the license therein granted to experimenters with the test, that is the subject of the present comment. The interest and attention which the Rorschach experiment has received is now a matter of common knowledge. Indications are that this interest is, if anything, on the rise. Vernon, in his most recent review of the literature,[2] says that to his certain knowledge the test is now being employed in fifteen countries and a dozen different languages. An estimate made to the present writer, based to be sure on hearsay, is that the number of countries is nearer forty.

In other words, it is certain that the Rorschach method is even now entering on a period of wide and extensive application, with the necessary concomitant testing of its own validity, as well as of the psychological principles on which it rests. It seems advisable therefore that the possible alternative experimental attitudes with which it can be approached be appraised, and the atmosphere on this point clarified.

The Bleulers, in the expression "feel himself into" the response, when evaluating it, represent one mode of attack. In essence this is the artistic-intuitive approach. It is a rejection of the objective-standardized method. In effect it is a granting to each examiner a liberty to score as his subjective reaction directs. It grants to each experimenter his poetic license in what purports to be a scientific undertaking—and license ultimately becomes just that, *license.*

This dispensation is likely to become doubly potent because issued, as it is, under the great name "Bleuler." It is representative, as it happens, of the methods which the present writer noted in some eight months' observation of the test's use in its cradle, Zürich. Its consequence can only be to aggravate the distressing finding which serious experimenters have already observed, namely, that too seldom do any two researches by different investigators of comparable personality groups yield satisfyingly comparable results. How can they if each investigator gives us what *he* has *felt into* the responses? It is hardly to be expected that the abstracted essence of any two experimenters' feelings should assume similar psychogrammatic forms. Investigators in personality, psychiatrists

[1] M. Bleuler and R. Bleuler, "Rorschach's Ink-blot Test and Racial Psychology: Mental Peculiarities of Moroccans," *Character and Personality,* 1935, IV, 97-114.

[2] P. E. Vernon, "Recent Work on the Rorschach Test," *J. Ment. Sci.,* 1935, 1-27.

or psychologists, happen to be all too human.

Nor does the challenge "stereotype classification" in the Bleulers' language need to disarm the student who scores by standardized lists and forms. The strict application of constant rules, and careful disciplining of himself, will never minister against the great artist's developing into one, with this or any other technique. The virtuoso pianist must still begin with finger exercises. The virtuoso Rorschacher will be no less great for having set his foundation in scientifically constructed norms and classifications.

Since the Bleulers do not, in their paper, cite specific responses, with their scorings or classification, the present criticism cannot be more specific, or illustrate from concrete examples. One can only call attention to the Rorschach scoring categories which such subjective judgment is likely to influence, in the direction of impairing both reliability and validity of findings. These are, primarily, the "good form" or F +; the common detail, D, as contrasted to the rarely selected one, Dr; the nuances of the color responses (pure color, color-form, form-color); and, probably most important of all, the movement, M, response. Take, for example, the "good" forms—in the test indicative of clear, i.e., sharp perception. But, since the Rorschach figures start with being ink-blots, i.e., meaningless, no interpretation is *a priori* a sharp one, since any one person's is as good as the next man's. It follows that some objective standard must be set up whereby to measure the "clearness" of any interpretation. Presumably the reactions of a homogeneous, healthy group would constitute such a set of norms. Rorschach does in fact claim that he employed such norms: *"Es dienten als Norm und Basis diejenigen Formantworten, die von einer grössern Zahl (ca. 100) vollsinniger Versuchspersonen am häufigsten gegeben worden waren."*[3] Unfortunately, Rorschach has not published his set of norms, nor has anyone else published any. Until such a list does appear, serving as a constant foot-rule, we can not speak of Rorschach responses being scored F + or F — by any stable criterion. Similarly, if one investigator is to compare his work with that of another, they should both employ the same list of "details" and "rare details," D and Dr. To discuss all the problems incident to establishing objective criteria for the several categories is beyond the scope of this brief note.[4] One can only, for example, note the importance of such a reaction as the perception of movement, and the intimate personal experience it presumably represents. In view of the far-reaching judgments as to personality made on the basis of it, can the scoring of a response as M or not M be left to the personal feelings of every investigator?

The danger of the Bleuler position lies, of course, in the freedom which experimenters, on this authority, will feel in scoring in accordance with subjective dictates. The consequence can only be confusion worse confounded. The need of fixed standards in scoring Rorschach responses is a refrain that continues to run through new papers on this test. To make "feeling one's self into" the scoring a cardinal principle will, to repeat, mean that reports of "researches" will in reality be, in considerable part, reports of experimenters' feelings. They are as likely to reflect the examiner's, as his patients', personalities. The lack of agreement and apparent unreliability of the method will continue. The net result must only be to impair the psychiatric

[3] *Psychodiagnostik* (Berlin, 1932), p. 23.

[4] The writer considers them more fully in "Problems of Further Research in the Rorschach Test," *Amer. J. Orthopsychiat.*, 1935, V, 100-115.

and psychological world's confidence in this most promising method. This would be unfortunate. The method itself happens to be sufficiently constant, and amenable to constancy in evaluation, such that it may prove itself one of the more valuable instruments so far devised for studying the personality objectively.

S. J. BECK.
Harvard Medical School.

Great Britain

A Clearing House for Material on Human Genetics

The British National Human Heredity Committee was formed in 1932 for the collection of data and the investigation of human pedigrees as a branch of the International Human Heredity Committee, founded by the International Federation of Eugenic Organizations. It has now been enlarged as a council and secured accommodation at 115, Gower Street, London W. C. 1., and in collaboration with the Galton Laboratory aims at setting up a clearing house for material on human genetics. The Council consists of a number of geneticists and leading medical men, with Professor Ruggles Gates as Chairman, Sir Laurence Halsey as Treasurer, Dr. Fraser Roberts as Honorary Scientific Secretary, and Mrs. C. B. S. Hodson as Honorary General Secretary. The direction of the work is to be in the hands of a small executive committee.

The Council would be grateful to receive all available material from institutions and individuals, furnishing well-authenticated data on the transmission of human traits, whatever these may be. Family histories or pedigrees, twin studies, and statistical researches are mainly contemplated. As research workers and others who send in material may in some cases wish to retain the sole right of publication or copyright, those who so desire are asked to accompany their material with a statement to that effect.

Reprints of published work would also be most acceptable. Many authors, when publishing material, may also have collected a number of pedigrees which they have been unable to reproduce in detail. It is the object of the Council that such records, by being included in the clearing house, should not be lost. Those wishing a copy of the standard International Pedigree Symbols may obtain one from the Office.

Material should be accompanied by all available details in regard to source, diagnostic symptoms, and the name and address of the person or persons who vouch for accuracy. All such details will be regarded as strictly confidential.

The other objects contemplated in this enterprise, namely, facilities for study, replies to inquiries, and information service, cannot be initiated for some time. Announcement of these activities will be made later.

JAN MELOUN.

BOOK REVIEW

SOCIAL PSYCHOLOGY. By J. K. Folsom. New York and London: Harper and Brothers, 1931. Pp. 663.

The author develops his social psychology along very logical lines. He first considers the native endowment of man, then the elements of acquired organization of behavior, up to the genesis of wishes and personality. Next he takes the problems arising from frustration of these wishes, with readjustment of personality, and discusses the measurement of individual differences. With interactions of personalities begin the phenomena of social life. The patterns of behavioristic interaction are the first to be discussed, then those more organized ones of social control and decision, leading us to the discussion of cultural attitudes and changes. Finally, we come to social psychiatry and the future of social psychology.

Into this framework Dr. Folsom fits an account of the more important researches in each of the fields. His accounts of these are commendable for their lucidity and succinctness, erring rather in sometimes giving an exaggerated impression of the concreteness of all psychological problems.

Identifying mind with the organization through a nervous system of individual human behavior, Folsom at once identifies himself with the Watsonian school and indicates a study of nervous structure as the starting-point for the understanding of his outlook.

In a highly interesting chart, he has affixed in the rear of an erect human figure a list of "somatic" reflexes, each written down, so far as feasible, near the muscles chiefly taking part in them; and he has similarly placed in front of the figure a list of visceral reflexes. Next comes a column of "basic (partly inborn) reaction patterns" beginning with "hunger reactions" and ending with "miscellaneous discomfort reactions." To each of these items are drawn lines, showing their derivation, from appropriate items in the lists of the "somatic" and visceral reflexes. Thirdly, Folsom has a column of "universally acquired habit-patterns" ranging from shelter-habits to gesture-habits. Fourthly, comes a column of "general types of attitude from passive or active to experimental or economical or humiliated." Finally, there is a column of "wish goals"—classified under those for response, new experience, recognition or security, after the manner of W. I. Thomas.

If this chart arouses in us the suspicion that his outlook is somewhat mechanical, this becomes confirmed as Folsom goes on to lay down his whole basis for "the acquired organisation of behaviour." Thinking itself is merely "a chain of silent words or other internal symbols"; while attitudes "are the headings under which the nervous system [*sic*] classifies its numerous reactions."

Controlling attitudes, even as attitudes control habits, says Folsom, are wishes. But wishes are subject to frustration, which creates suffering and so is harmful. That mental conflicts, indeed, are not harmful except as they involve wish-frustration is deduced from his own experience by the author, "introspecting as well as a behaviourist can." (Delicious phrase!)

Having got himself well into the subject of conflicts, he, fortunately, does not allow the label of behaviourism to stand in the way of an honest coming to grips with the facts. Fruits of recent psychopathology are placed frankly on the table, including those obtained by psycho-analysis. Nay, Freudian "mechanisms" are approvingly cited as "useful tools" and described with a great degree of understanding.

But having conceded so much of substance of Freud, Folsom checks himself guiltily lest he give all that and the shadow as well. He shows himself less effective as critic, using time-worn objections, the replies to which it is strange that so well-read a man should apparently never have seen.

However, he grants that analytic observation gives an insight into the subtler personality-differences, as also into biography and history, which cannot be attained through the experimental method of measurement which he is at pains to describe.

We find ourselves now faced with "the study of the action of human personalities upon one another"—the definition given of *social psychology*. "Just as reflexes are organised to form personality, so personalities are organised to form social groups." The controversy over the existence of a *social mind* is resolved on a basis nearer to the attitude of Allport than the mystical one of Le Bon. Its reality consists in social interactions. Partly these are intermediated by the environment; but for the rest they are behaviouristic—imitative, sympathetic, or suggestive. Trenchant and well-documented criticism is passed on the older views of the nature of limitation and also of sympathy. Unfortunately, the author, ignoring the masterly treatment of this subject by Dr. Ernest Jones, deals less competently with the third member of the trio but rashly announces that "unlike imitation and sympathy, suggestion is an elementary interaction mechanism."

When it comes to details of just what "patterns" are those by which personalities or groups react upon each other, rivalry is indicated for especial notice. Experiments, such as those of Allport, show how generally work is speeded up (although complex mental processes sometimes suffer) by being done publicly. Rivalry is especially apt to lead to conflict, although this in turn tends to give way to accommodation, with a resulting differentiation of personalities into dominant and submissive or into other specializations.

Interaction is not only a spontaneous phenomenon; it exists also as organized or controlled. For one thing, there takes place *selection* by environment or by human agency. Among the agencies, some are individuals, others are institutional, while still others (public opinion, etc.) are unorganized pressures. The instruments of social control may operate by suggestion (commands, slogans, etc.), by argument, by inducements (economic gain, etc.) or by deterrents.

In addition to all the above forms of extra-controlling behavior is mentioned (following Allport) behavior which is self-adaptive.

A criticism of the view that coerced behavior is the antithesis of voluntary behavior leads the author into a shockingly inadequate discussion of the latter. All the experimental researches from Ach's and Michotte's and Prum's down to those of Avelling's students on the one hand, and of the psycho-analysts on the other—both of which types converge upon an identification of a course of conduct with self as the essence of will—are ignored. "This 'willing' process," so it is stated, early "consists in the passage of certain nervous impulses."

By comparison, there follows a well-documented consideration of the

disadvantages of negative forms of control and of the dangers of the positive "super-controls" getting into wrong hands. Here are discussed weaknesses of governmental machinery, misleading effects of "stereotypes," manipulation through propaganda by special interests, the likelihood that functional representation would work better in politics than geographic representation does and the decline of interest in voting.

"But," says Folsom, "the ultimate aim of science is to formulate generalisations." And thereupon he enters upon an examination of *culture*, defined as consisting "of the more constant features of social life." The differences between cultures are to be accounted for on historical, more than any other, grounds.

Here Folsom presents us with another of his ingenious charts. In a first column are listed the instrumental institutions of culture, whether of our language-system or of material culture. Connecting lines show how these give rise to the instrumental functions of culture (e.g., communication) and how both together give rise to institutions "yielding direct gratification" (e.g., the family). These lead on to "goal-functions of culture involving mixed wishes" (e.g., intimate personal contacts); and these, finally, to the individual "final goal-functions of culture." The cultures "channelize" the ways in which human beings pursue their wishes.

Primitive culture is not *psychologically* different from civilized, in spite of Levy Bruhl's revelations on the thought-patterns of the former and in spite of totemism. In the discussion of this last, Roheim's hypotheses are thrown out of court on the mere, and dogmatic assertion that "the varying parts of totemism cannot be fitted into any one such specific explanation" and without attempt to prove this nor to hint at any more satisfactory hypothesis. Folsom also backs Malinovski in the latter's premature dismissal of Freud's *Oedipus complex* because in Melanesia it is on father surrogates (uncles) not on fathers themselves, that jealousy becomes centered.

At this point Folsom returns to the consideration of group attitudes. A great many research techniques, and the results obtained from these in measuring attitudes, are summarized. Unlike biological traits, attitudes are not distributed normally among the population, but often bi- or multi-modally. Attitudes tend to correlate with racial, regional, religious, occupational, or geographical groupings.

The organizational features of culture are cyclic. Concerning this, Spengler's tables of culture epochs are cited, though with skeptical comments, Ellwood's parabolic curve of culture-evolution is reproduced, and Chapin's theory of "societal reaction pattern" is explained. This leads us on to discussion of the starting-points in cultural change, the requirements of invention and the nature of cultural lag, inertia, rhythm, resistance, "one way streets," and transvaluations. The part played in these processes by true leaders is greater than that of mere officers, yet the leader is created by circumstances.

It may seem that the practical application of all the above must be measured by what it adds to our power of social control. But certain forms of such control are indeed relatively useless—as where psychology enables us to train salesmen to make people buy things they do not need. The truly valuable form is attained in social mental hygiene.

Many social symptoms of maladjustment are then discussed. The causes of these maladjustments are analyzed into—personal discord, frustrated "excessive love," isolation, rivalry, insecurity, repression, and disappointment.

The treatments to be recommended

in such unhealthy situations are three, namely: to move the people away, to rearrange the situations, or, without doing either of these, to change attitudes by stimulating or re-educating (never by reproaching). The author recommends, for giving attention to individual cases plus an increase of economic security, training of psychiatric counsellors, facilitation of mobility of persons, and the application of mental hygiene in the schools.

After this long examination of the contribution which psychology today can make to the understanding of social problems, Folsom fittingly terminates with some observations on the *future* of social psychology. First consideration is given to the question of the methods of research to be used. The historical, case, comparative and statistical methods all have attained a place.

A plea is made that the knowledge which shall be amassed by these investigations shall not remain the monopoly of specialists, but "that grade school children should learn certain elementary facts, and methods of thinking about human beings." For the goal is "not to help some people exert better control over the rest, but to free all people."

PRYNS HOPKINS.
University of London.

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OUR PROGRAM

After much consideration it has been decided to guide this journal in a somewhat novel direction. Up to the present it has consisted almost exclusively of original articles, and in this sphere may claim to have been singularly fortunate. Young as the journal still is, it has already been supported by such contributors as G. Allport, Bleuler, Wm. Brown, Cattell, Dessoir, Downey, Driesch, Hopkins, Jung, Katz, Kretschmer, Lewin, Lundholm, Luria, McDougall, Mead, Pavlov, Pear, Roback, Sante de Sanctis, Stephenson, Stern, Terman, Tolman, Vernon, and Wiersma, to mention only a few.

The new program proposes to maintain its share of such outstanding original contributions, but at the same time to find more space than hitherto for the realization of another purpose; namely, to keep our readers oriented in all the more important current movements taking place in the study of Character and Personality.

We plan thus to present comprehensive surveys of what is going on in different parts of the world. We are arranging to get representatives of those fields of research most closely allied to ours: psychiatry, cultural anthropology, heredity and endocrinology, child guidance, human problems of industry, jurisprudence and criminology, biography and literary criticism, art, sociology, politics, and economics. These representatives will tell us what the psychology of personality is doing in each of these fields; and, conversely, will present the contributions from these various lines of study and develop their implications for our central field.

Such a plan cannot be carried through without wide and cordial co-operation. For the support of this enlarged program a considerable increase in the number of our subscribers is essential. Without this increase the journal cannot meet its inevitable expenses; there is no aim whatever at profit. We therefore urgently invite all persons and institutions interested in such a program to enroll themselves among our members.

THE STUDY OF PERSONALITY AND THE METHOD OF EQUIVALENT AND NON-EQUIVALENT STIMULI

HEINRICH KLÜVER

Otho S. A. Sprague Memorial Institute and the Division of Psychiatry, University of Chicago

In an attempt to determine basic mechanisms of behavior in subhuman primates I made previous use of a method which I called the "method of equivalent and non-equivalent stimuli." This method is applicable to a wide range of animal forms and may be utilized in studying reflexes as well as the most complex behavioral reactions. Its use is not confined to the field of comparative psychology.[1]

It has been demonstrated that a given response may not be affected by certain changes in the environmental stimulus constellation and that even very pronounced changes may leave the response unaltered. Thus heterogeneous stimuli may be equivalent in the sense that they call forth the "same" reaction. Yet if the stimulus situation is varied sufficiently or within certain directions this response may be variously disturbed (degrees of equivalence) or it may disappear (non-equivalence).

In considering the method of equivalent and non-equivalent stimuli, two points should be emphasized from the beginning: (1) As far as the method itself is concerned, it is immaterial whether the response which is taken as an "indicator" represents an unlearned reaction or a reaction established by conditioning or training. Any verifiable response may serve as a point of departure for arriving at groups of equivalent and non-equivalent stimuli. (2) Instead of starting from a given response, we may start from a given stimulus situation and determine equivalent and non-equivalent reactions. Forms and degrees of equivalence exist on the stimulus side as well as on the response side. That the method has been designated as the "method of equivalent and non-equivalent stimuli" is not

[1] H. Klüver, *Behavior Mechanisms in Monkeys* (Chicago, 1933).

meant to imply that the determination of equivalent stimuli is in any way more significant than the determination of equivalent reactions. The fact that we refer to certain events as "stimuli" and to others as "responses" is, as could be easily shown, to a certain extent arbitrary and provides merely the starting point for an experimental analysis of behavior.

Equivalence and Non-Equivalence

Before proceeding further we shall consider characteristic forms of equivalence and non-equivalence in various animals. The following examples are chosen at random from the literature or from our own observations.

Breder and Coates[2] found that sexually active males of *Lebistes reticulatus* attempted fertilizing a number of objects. If isolated for a week they responded positively to females in the same aquarium, to females in an adjacent aquarium not more than 15 cm. distant, to anesthetized females, to males, to specimens of *Cyprinodon variegatus, Fundulus heteroclitus,* and *Barbus conchonius,* and to the projected shadows of living fishes on the side of the aquarium. They did not respond to carefully made models of females, either moving or still, or to females behind opaque but perforated screens; they also did not react to their own images in mirrors outside the aquarium.

Buytendijk[3] made some observations on toads *(Bufo calamita)* placed in a cage with a number of inanimate objects, such as matches and strands of moss. As long as the hungry animal had not received any food it did not pay the slightest attention to these objects. After it had eaten a worm it began seizing the broken matches, and after it had eaten a spider it began picking up the moss.

Allen,[4] in his studies of behavior associated with the sex rhythm in the ruffed grouse, found that a stuffed grouse or a grouse skin or a dead grouse would under certain conditions elicit the same reactions; "the exact pose was unimportant so long as it was more or less flattened, or at least not mounted in an attitude of display, and the sex of the stuffed bird was equally unimportant."

[2] C. M. Breder and C. W. Coates, "Sex Recognition in the Viviparous Poeciliid *Lebistes reticulatus*," *Anat. Rec.*, 1934, LX, Supplement, p. 45.

[3] F. J. J. Buytendijk, "L'instinct d'alimentation et l'expérience chez les crapauds," *Arch. néerl. de physiol.*, 1917, II, 217, and F. J. J. Buytendijk and H. Plessner, "Die Deutung des mimischen Ausdrucks," *Phil. Anzeiger,* 1925, I, 72.

[4] A. A. Allen, "Sex Rhythm in the Ruffed Grouse (*Bonasa umbellus* Linn.) and Other Birds," *The Auk,* 1934, LI, 180.

In an investigation issued from the Institute of Animal Genetics, University of Edinburgh, Wiesner and Sheard[5] report some experiments in which the retrieving response of female lactating rats was used as an indicator. They found that retrieving by a mother rat was not restricted to her own young. Lactating females retrieved not only the young of other rats (in one instance fifty-eight young were collected in less than seven minutes) but also mice, one- to six-day-old rabbits belonging to various breeds (Polish, Himalayan, Belgian, Crossbred), kittens varying in weight from 100 to 150 grams, and chicks. That is to say, rats, mice, rabbits, kittens, and chicks were equivalent in terms of the retrieving response. At times even anesthetized newborn rats elicited the same response.

In this connection some recent observations by Russell[6] should be quoted. A bitch which had been taught to retrieve a ball was found to retrieve a variety of objects such as stones, pine-cones, broken boughs, a gooseberry, an orange, a bottle cork, a raw potato, a box of matches, a wooden cube, a clean dry bone, a rubber boot-sole, and a long-handled hearth brush. The animal was then trained to retrieve pennies, receiving as a reward a piece of cheese. Further observations showed that the particular response as described by Russell was not specifically to a penny but to any coin from a sixpence to a half-crown, and extended to small objects such as a bottle cork or a brass hook. Attention is called to the fact that a given object, for example, a bottle cork, was in one situation equivalent to a ball, that is, a retrievable object, while in another situation it was equivalent to a penny, that is, a means towards cheese.

Sarris,[7] working under von Uexküll, made an attempt to analyze the reactions of dogs to words. The dogs could be trained to respond to a variety of verbal commands. For example, when the words *auf Stuhl* were uttered the dog would jump upon a chair. In certain experiments the chair was then removed or its position or appearance was changed. In such situations the dog would respond to *auf Stuhl* by jumping on a box; a divan; a foot-stool; a shelf; a chair without a back; a chair enclosed in gray paper; a chair upside down or pushed under the table. Under certain conditions a given object such as a box was responded to not only as "chair" but also

[5] B. P. Wiesner and N. M. Sheard, *Maternal Behaviour in the Rat* (Edinburgh and London, 1933).

[6] E. S. Russell, *The Behaviour of Animals* (London, 1934) and "Playing with a Dog," *Quar. Rev. Biol.*, 1936, XI, 1.

[7] E. G. Sarris, "Sind wir berechtigt, vom Wortverständnis des Hundes zu sprechen?" *Zsch. f. angew. Psychol.*, 1931, Beiheft LXII, 1-139.

(in connection with the commands *"Geh in dein Körbchen"* and *"Komm unter den Tisch"*) as a "basket" or a "table." These commands were appropriately responded to, although the German words appeared at times as parts of a Greek text recited to the dog. At a certain stage of experimentation the German *Setz' dich* and the Greek *κάθμ* and other commands expressed in either Greek or German were equivalent if the same intonation or the same "sentence-melody" (which Gardiner[8] insists is merely a more picturesque name for intonation) was used in uttering these commands. At a later stage of experimentation this equivalence had disappeared. As a point of further interest the response elicited, for example, by *"Komm zu dem Fleisch"* could also be elicited by the words or sounds *komm; zu; dem; Fleisch; ko; Fl; Fla; isch; sch.*

In studying the ability of monkeys to utilize objects as "tools," I found that certain Cebus monkeys were capable, for instance, of obtaining a piece of banana beyond reach by means of a stick. In such a situation the same animals also made use of a variety of other objects: a sack, a towel, a newspaper, branches of a tree or strips of bark, a meshed wire, a wire ring, a rope, a leather belt, a bottle brush, a floor brush, a fern leaf, a steel strip, a string, a toothpick, a dead mouse, a live rat, a live guinea-pig, and a carrot. While these objects were unhesitatingly used in obtaining the food, a toy monkey was at first not even touched and was only reluctantly used after a long time and then in such a way that contact with its fur was avoided as much as possible. A toy snake was treated with the same reluctance; a live snake was not even touched. Although, of course, not successful, the animals also tried to utilize the chain to which they were tied, or attempted to obtain or establish contact with the food by pulling their own tails with both hands towards the goal. Other experiments showed that a given object such as a stick was utilized in obtaining not only food but also many other objects and even employed in attempts to "pull in" the *shadow* of a banana on the wall (which happened to be in reach while the banana itself was beyond reach) or a chalk drawing on the floor which also was beyond reach.

As regards monkeys, many observations indicate that a large variety of stimuli may be considered equivalent in terms of the so-called "grooming" reaction or "fur-picking" response. In fact,

[8] A. H. Gardiner, *The Theory of Speech and Language* (Oxford, 1932).

Zuckerman[9] concludes that "any hairy object, animate or inanimate," may elicit this response. However, I have observed monkeys which will display this characteristic reaction even toward a piece of galvanized iron or other metal objects, such as keys, so that the equivalence ranges from furry to metal objects.

Finally, I should like to mention some recent incidental observations on squirrel monkeys *(Saimiri)*. When food is thrown into the cage the eating is almost invariably preceded by "wrapping up" the food. Not only is this done with moist food such as a piece of orange or grapefruit or even ice cream—in such instances it frequently appears as if the animal were trying to remove the moisture —but also with dry food. But these animals will also "wrap up" toys and a large number of wooden or metal objects and even electric bulbs, no matter whether lighted or not. For the "wrapping up" a variety of objects, ranging from a towel, a handkerchief, a piece of paper to the animal's own tail, are utilized.

We are not concerned here with a critical evaluation of the conditions under which the material just presented was obtained. In the above examples it was our intention merely to illustrate forms of equivalence and non-equivalence as found in different animals. The facts reported are sufficiently clear to bring out a number of points.

(1) In studying the relations between organism and environmental stimulus situation, we encounter an equivalence of stimuli and an equivalence of reactions on various levels of behavior. The *same* response may be elicited by widely different stimuli; the *same* stimulus may call forth widely different reactions. No matter what the interpretation of such facts may be, it is clear that the existence or non-existence of equivalence can be determined by the application of experimental methods. The facts themselves cannot be questioned as long as the experiments are carefully controlled. Forms of equivalence arrived at in such a manner are instances of what I have previously called *objective* equivalence.[10]

(2) It appears that certain responses are called forth by a very large number of different objects, whereas in other instances the number of objects is small. There are differences in the *range of equivalence*. It is apparent that most investigators have not even made the attempt to determine this range. Although at this point

[9] S. Zuckerman, *The Social Life of Monkeys and Apes* (London, 1932).

[10] H. Klüver, "The Equivalence of Stimuli in the Behavior of Monkeys," *J. Genet. Psychol.*, 1931, XXXIX, 3, and *Behavior Mechanisms in Monkeys* (Chicago, 1933).

we are not interested in the factors affecting the range of equivalence, we should like to call attention to the interesting problem of whether there is ever an absence of equivalence. The literature provides us with many impressive examples of the rigidity and specificity of instinctive behavior. In fact, such specificity does not seem to be confined to animals such as moths and spiders. Russell[11] quotes an observation made by Pitt on a fox-cub which would steadily refuse strips of rabbit flesh without the skin. In case some fur was attached to the meat the behavior of the animal would undergo "an amazing transformation." The meat would be immediately seized. The observer reached the conclusion that the soft rabbit fur was the specific stimulus which, as a trigger, "released the instinctive knowledge that there was something to eat." We insist that in all instances in which specificity is assumed, the non-existence of equivalence must be first experimentally demonstrated. Unless this is done in each instance no safe conclusions as to the existence of "specific" stimuli can be drawn.

(3) It is obvious that it is not sufficient merely to demonstrate forms of objective equivalence. Ultimately we are not interested in the fact that there is such a thing as an equivalence of stimuli and an equivalence of reactions; we are ultimately interested in *functional* equivalence, that is, in the factors bringing about or accounting for these forms of behavior. It appears from the examples given above that most investigators have not succeeded in determining these factors or have not even made an attempt to do so. We are forced to conclude that the constancy of response in the presence of widely different stimuli is linked up with some constant factor on the stimulus side. The equivalent stimuli must have something in common; they must be identical or similar in some respect. As unavoidable as this conclusion may seem, it does not help us very much in defining the "common factor" or the "identity" or "similarity" underlying *particular* forms of equivalence. In the particular case it may be very difficult to make the step from objective to functional equivalence, a fact which is clearly recognized, it seems, by Wiesner and Sheard.[12] "All the observer is permitted to state is that a young rabbit or a young kitten or a small mouse are stimuli equivalent to young rats of a certain age, even though they are differently shaped to our eyes and are either bigger or smaller. The only interpretation of this fact which occurs to us is this: that these various objects have

[11] Russell, *The Behaviour of Animals.* [12] Wiesner and Sheard, *op. cit.*

a common property which acts as effective stimulus." But what is this common property? What is it in this particular case that accounts for the objectively found equivalence? We shall quote Wiesner and Sheard at some length:

> It is impossible at the present moment to decide what this common property actually is. It is certainly not size; for the very young rabbit which is retrieved by a female is bigger than a rat 16 days old which may not be retrieved by the same female; while, conversely, the newborn mouse is less attractive to the rat than the newborn rat, although the latter is bigger than the former. Nor can it be a very obvious kind of movement-pattern evident as such to human eyes. For the movement-patterns of the various species differ widely from slow crawling with searching movements of the head (very young mouse and rat nursling) to jerky and violent jumps (rabbit) or sudden movements of the head accompanied by body tremor (kitten). The "common property" cannot be represented by the absence of resistance on the part of the retrieved animal either. Within the first two weeks of life the rat and mouse are incapable of resisting the mother, and, generally speaking, even older young who are running freely about the cage do not resist. Still, the kitten and rabbit who frequently resist actively (though not very effectively in the case of the rabbit) elicit retrieving responses in mother rats who do not respond to rats 16 days old, even though the latter submit readily enough.

The authors finally conclude that the common property may be of a general character such as "a configuration indicating babyishness" or it may be a simpler property—"such as an odour common to several mammalian species in their infancy." It is clear then that these investigators have failed to define the nature of the common property accounting for the equivalence; it is equally clear that this goal could have been reached only by pushing experimentation much further, that is, by applying the method of equivalent and non-equivalent stimuli in a *systematic* manner. However, in contrast to many other workers, Wiesner and Sheard have at least recognized the importance of the problem and even seem to be fully aware of the fact that the analysis, for instance, of the effects of gonadotropic hormones or other extracts requires a knowledge of the properties underlying various forms of equivalence.

On the whole, it must be concluded that the forms of equivalence reported by different investigators in various animals at best represent points of departure for further experimentation directed towards determining the factors responsible for the equivalence.

(4) If we consider some of the observations of Russell and Sarris on dogs, or the toad experiments of Buytendijk, it becomes apparent that no matter what the properties underlying various forms of equivalence may be, the existence of these properties is linked up not only with conditions in the external world but also with conditions in the organism. The fact that we frequently have a shift from equivalence to non-equivalence (whether of stimuli or of reactions) or a change in the range of equivalence cannot be understood, it seems, without reference to a change of conditions in the organism or, differently expressed, in the "inner field." Whether we call these conditions organic states, needs, drives, wants, or attitudes, etc., does not matter in this connection. The ornithologist Howard[13] has given many striking examples of how a bird often reverses its behavior. These reversals, he tries to show, are explainable only by the fact that a bird lives in different worlds—"in a territory world, a sexual world, a nesting world, a brooding world." As we go from one world to the other the effective properties change and, consequently, the forms of equivalence on the stimulus and on the response side also change. The same problem is touched upon by Buytendijk when he says: *"Un même objet, dans le même milieu, n'a pas toujours la même signification pour l'animal (témoin ses façons différentes de réagir). Cela ne peut être expliqué que par l'état de l'animal même, notamment par son état psychique. Cet état psychique dépend de nombreuses conditions."*[14] Changes in what Buytendijk calls the "mental state" and changes in what he terms the "signification" of objects are intimately related, and it is according to him the task of experimental animal physiology to study this relation. However, in studying this *relation* which is a relation between the "outer field" and the "inner field," it is obviously not sufficient merely to state that different reactions to the same stimulus situation or reversals in behavior are linked up with certain changes in the conditions of the inner field. Wiesner and Sheard, for instance, report sudden changes in the behavior of their rats *"without any detectable change in field conditions having occurred,"* that is, changes in behavior without changes in the outer field. Of course, the outer field may be said to remain the same only from the physical point of view. For the animal, the properties with which the outer field is invested before the change and the properties with which it is imbued after

[13] E. Howard, *The Nature of a Bird's World* (Cambridge, 1935).

[14] Buytendijk, "L'instinct d'alimentation et l'expérience chez les crapauds," *op. cit.*, 217.

the change are *different* properties, and the problem as to what these properties are is obviously not solved by reference to the change in the conditions of the inner field. Conversely, the fact that a given response perseveres after radical changes in the *outer* field is not explained by reference to the radical changes in the stimulus situation.

(5) From the examples given it should be obvious that the factors underlying equivalence cannot be determined without considering the properties of *non-equivalent stimulus situations.* The fact that there exists a certain "common property" in a group of widely different stimuli eliciting the same response does not necessarily mean that it is this "common property" which accounts for the consistency of the response. If we find that there exist a number of other stimulus situations which, although exhibiting the same property, *do not* elicit this response, it follows that it cannot be this "common factor" which is responsible for the equivalence. It also follows that we must look for something accounting for both the equivalence and for the difference between the groups of equivalent and non-equivalent stimuli. In other words, there must be some property or constellation of properties which is present in the group of equivalent and not present in the group of non-equivalent stimuli, or vice versa. It seems that the facts of non-equivalence cannot be too strongly emphasized when it comes to determining mechanisms operative in behavior. That a certain stimulus situation does not elicit a given response may be more important than the occurrence of this response in hundreds of other situations. In experimental work it becomes easily apparent that no definite conclusions as to the factors underlying equivalence can be reached without considering the facts of non-equivalence. Of course, no general statement as to the experimental approach necessary to reach these conclusions can be made. The way certain factors have to be experimentally varied in a particular case depends on the problem. (Whether or not the forms of equivalence and non-equivalence found by an experimenter will always throw light on the question he seeks to answer is another matter.)

Equivalence and non-equivalence point to the existence of different factors. The effectiveness of certain factors is demonstrated, in fact, these factors themselves are ultimately defined, by demonstrating the non-existence, the disappearance, or the ineffectiveness of other factors. That certain stimulus properties are not or cannot be reacted to, or cannot be reacted to in a certain way, is, it seems, a characteristic feature of so-called "defects" in pathological cases.

From this point of view forms of "normal" and "defective" functioning and forms of equivalence and non-equivalence are in many ways closely related. It is our contention that this relation was clearly recognized a long time ago by Hughlings Jackson in his "duplex theory" of positive and negative elements. No one, as Head[15] points out, attempted to understand the contributions of this man until Arnold Pick dedicated his book *Die agrammatischen Sprachstörungen* to "Hughlings Jackson, the deepest thinker in neuropathology of the past century." It is perhaps not always easy to follow the implications of Jackson's reasoning. The idea of positive and negative elements is a recurrent theme in his writings, and practically every disease he is dealing with, and even therapy, is discussed with reference to it. It is very apparent that for Jackson the difference between positive and negative elements was of fundamental importance, although the views he held in this respect stand in close relation to his views on evolution and dissolution of the nervous system. No matter whether his special views regarding the functions of the nervous system are right or wrong, the duplex theory of positive and negative elements remains, we believe, a great contribution. In the following we shall attempt to outline this theory and to illustrate it from various angles.

HUGHLINGS JACKSON'S "DUPLEX THEORY" OF POSITIVE AND NEGATIVE ELEMENTS

As an example of "duplex symptomatology" Jackson offers the following case: "A sack dealer was delirious during erysipelas. The house surgeon opened a small abscess in one eyelid while the patient was in a strait-jacket. The patient's account of these circumstances was that he had been to a public-house, that the landlord fastened him down with two sacks, and then poked out one eye."[16] Jackson urges that in this case "we have not only to take into account the patient's 'pseudo-knowings'—that he had been to a public-house, etc., his delirium sampling a positive element—but also his 'not knowings'—that he was in hospital, etc., sampling a coexisting negative mental element. We say that the patient's account was of a delusion ('pseudo-knowings'); there was a delusion for us, but in him a belief." Jackson then considers the concomitant physical states, and it may be said in this connection that he always attempted to approach the problems of insanity in what he termed a "brutally materialistic manner." He assumes in this patient two abnormal cerebral states corresponding to two abnormal mental elements. He brings into the picture at this point his views on evolution

[15] H. Head, *Aphasia and Kindred Disorders of Speech* (Vol. I; New York, 1926).

[16] J. H. Jackson, *Neurological Fragments* (Oxford, 1925).

and dissolution. "The negative mental state—the sack-dealer's 'not-knowings'—signified loss of function of the highest range of his highest cerebral centres. (If any one objects to the term 'highest centres,' he can substitute 'certain cerebral centres.') The mentation remaining possible to him—his 'pseudo-knowings'—signified increased activities of the intact lower ranges of those highest centres. . . . We have to bear in mind both the reduction (dissolution) and the range reduced to (the level of evolution remaining)." It is wrong to say, Jackson points out in another case,[17] that cerebral atrophy causes a patient's illusions since atrophied nerve tissue is "functionally just nothing, and cannot be the cause of anything positive; the positive mental symptoms, the illusions, arise during activity induced in non-atrophic, in healthy, nervous elements of what is left of the patient, at least, in elements capable of functioning. . . . Atrophy of the brain is no more the cause of illusions than softening of the brain in the case of an aphasic is the cause of his wrong utterances. The softening answers to the patient's inability to utter the right words; the atrophy answers to the patient's inability to see things as they are, that is, as he used to see them before the atrophy began. If a man takes a felt hat lying on the floor to be a black cat, it is as certain that, negatively, he does not see the felt hat, as that, positively, he does see a black cat; indeed, this is given in the expression, 'he mistakes a felt hat for a black cat.' To say that the patient cannot really *see* a black cat, 'because there is not one,' is of no avail. His nervous system is not ours; nor if it were quite like ours when he was well is it so when disease has occurred in it: he sees a black cat; we see a felt hat." In discussing "degrees" of insanity Jackson[18] again insists that "in every insanity . . . there is a double symptomatic condition, a condition of two opposite mental elements, one negative and one positive. . . ." In this case he symbolizes the various centers which may be rendered functionless or destroyed by some pathological process as A, B, C, and D and suggests that a first degree of insanity (or first depth of dissolution) may be indicated as follows: $-A + B + C + D$. "In fact, the whole person is now $B + C + D$. The term $-A$ is only given to indicate how the new person, the man insane, $B + C + D$ differs from the former person, the sane man, $A + B + C + D$. Suppose the sane man is X, then the insane man, the new person Y, is $X - A$, that is Y is $B + C + D$." Suppose a patient imagines that his nurse is his wife. "It is not enough to dwell only on the positive element, that he supposes the person attending on him is his wife, for this delusion of necessity implies the coexisting negative element that he does *not* know her to be his nurse (or some woman not his wife)." Thus his "not-knowing" is a sample of the result of disease ($-A$) and his "wrong-knowing" the outcome of what is left intact ($B + C + D$).

[17] *Selected Writings of John Hughlings Jackson,* ed. Taylor (2 vols.; London, 1931-32).

[18] *Ibid.*

In analyzing Jackson's writings on epilepsy, aphasia, and numerous other nervous and mental diseases, we find again and again that the coexistence of positive and negative elements is for him a matter of "extreme importance." One may well ask why the man who is now generally recognized as one of the greatest thinkers in neuropathology has laid so much stress on this point. At present, it would be somewhat rash to assume that he merely uttered truisms. It may be said first that Jackson's work itself is evidence of how fruitful an approach from this angle was. Head[19] finds that anybody who will attempt to examine, for instance, a case of aphasia according to Jackson's procedure "will find himself led to the discovery of phenomena" which will elude any other method. We would insist that the approach via positive and negative elements is essentially the same as the approach via forms of equivalence and non-equivalence. It is true that Jackson confined himself to the analysis of pathological cases, yet the two approaches are similar. The positive and negative elements of Jackson are also found in analyzing non-pathological forms of behavior. Conversely, the method of equivalent and non-equivalent stimuli can be as easily applied to pathological as to normal cases.

The question as to why these approaches should be fruitful, and, in fact, have been shown to be so, is not easily answered and we shall not here attempt an explanation. It is readily seen, however, that any other but a duplex approach may be one-sided or misleading because it is likely to ignore certain lines of evidence. It is frequently assumed, for instance, that from the knowledge of abnormal reactions we can infer the nature of the functions left intact. The duplex approach is fruitful, it seems, because it does not rely on such inferences and assumptions but actually determines the existence or non-existence of certain forms of behavior. It happens to be a fact that the reaction systems the neuropathologist or psychologist is dealing with are usually characterized by some sort of "interdependence" or "organization" or "integration" or whatever term one may choose. It seems that a misleading, if not entirely wrong, picture must result if this interdependence is entirely ignored. Jackson's duplex approach or the method of equivalent and non-equivalent stimuli do justice to this interdependence, although they do it perhaps only in a rough fashion, and perhaps only by way of a first approximation. Nevertheless, it is for this reason that they may succeed in illuminating the workings of such reaction systems.

[19] Head, *op. cit.*

Problems of Functional Equivalence

To refer again to the forms of equivalence and non-equivalence in animals previously enumerated, it cannot be too strongly emphasized that these examples do not give a clear picture of the difficulties inherent in making the step from objective to functional equivalence. Obviously, equivalence implies ineffectiveness of certain specific properties, conditions, or factors. The factors accounting for certain forms of equivalence may be of such a general nature as to imply the ineffectiveness of numerous other factors. That is, only after long-continued experimentation can the factors responsible for equivalence come to light. In most instances the method of equivalent and non-equivalent stimuli requires not less, but more analysis than other methods used in the study of behavior. The limit to which experimentation must be pushed depends on the nature of the factors involved in a given form of behavior. These factors manifest themselves in kinds and ranges of equivalence, and, whenever a serious experimental attempt at determining these factors has been made, they turned out to be far more complex than previously assumed. There have been so few serious attempts of such a kind that we shall not consider them. We merely mention that such an attempt was made in our work on sensory organization in monkeys and a similar attempt in certain phases of Lashley's work on the visual system of rats. The results we obtained in monkeys by a systematic application of the method of equivalent and non-equivalent stimuli have been described in considerable detail.[20] It seems that in many instances the factors underlying particular forms of equivalence are so complex that at present they can be defined only negatively, that is, by stating what they are not. But this seems to be a great deal more than what has been accomplished by other methods. From the extensive investigations of Mathilde Hertz[21] it appears that the determinants of behavior are far from being simple even in an animal such as the honey-bee. In commenting on these investigations von Uexküll[22] interprets the results to indicate that the bee has only two *Schemata:* circle and cross. As a matter of fact, Hertz arrived at factors such as "figural intensity" and "figural quality" which are far from being simple and which can and must be elucidated by further experimentation.

Any attempt to get at fundamental factors in behavior by study-

[20] Klüver, *Behavior Mechanisms in Monkeys.*

[21] M. Hertz, "Über figurale Intensitäten und Qualitäten in der optischen Wahrnehmung der Biene," *Biol. Zentbl.*, 1933, LIII, 10.

[22] J. von Uexküll, *Die Lebenslehre* (Potsdam, 1930).

ing forms of equivalence and non-equivalence must be guided by some hypothesis as to the nature of these factors. This hypothesis determines the manner in which experimental variations are introduced. Assuming that certain factors are operative, we suspect that they will manifest themselves in certain kinds of equivalence. In turn, the forms of equivalence experimentally found lead to a better understanding and a clearer delimitation of the factors operative. If we survey the field of modern psychology and related fields, we readily see that many of these factors are by no means clearly defined; yet about their fundamental character there can be no doubt.

In the following we shall consider the bearing of some of these factors on the problem of equivalence and non-equivalence.

(1) In case heterogeneous stimulus situations are found to be equivalent, it may be concluded that the stimuli are in some way "similar." Similarity plays a rôle not only in the sensory field but also in recognition, in the formation of "concepts," etc., and this rôle represents a fundamental problem not only for psychology but also for sensory physiology and other fields dealing with aspects of behavior. It has been often assumed that similarity always represents identity of partial constituents (no matter what these parts may be in the particular case). We believe that the facts supporting this view have nowhere received a more careful consideration than in von Kries's *General Sensory Physiology.*[23]

It is of interest that as cautious a physiologist as von Kries reached the conclusion that it is "perfectly hopeless" to reduce similarity to an identity of parts. He himself was finally led to the concept of a "non-analyzable similarity." That there are similarities at all he attributed to some *fundamentale Eigentümlichkeit* of the central nervous system. He also tried to show that any other view has led to disastrous results in physiology.

It is easily seen why anybody interested in linking up behavior mechanisms with neurophysiological mechanisms must concern himself with the nature of the factors accounting for the constancy or lack of constancy of response, that is, with the nature of the effective similarities. If it should be true that "similarity" cannot be reduced to an identity of parts, psychological and physiological analysis should take this fact into consideration.

If the similarity inherent, for example, in so-called constancy of "form" cannot be reduced to an identity of parts, the experimental problem of determining the conditions which do or do not affect

[23] J. von Kries, *Allgemeine Sinnesphysiologie* (Leipzig, 1923).

this phenomenon must be attacked from other angles. "Visual" phenomena may exhibit radical differences among themselves; yet there seems to exist some sort of "similarity" which sets them off from auditory phenomena. It may, indeed, appear "hopeless" to find "identical" parts in all existing visual phenomena, and perhaps von Kries is right in assuming that identity of parts does not create similarity but similarity creates an identity which is not an identity of parts. If this is correct, the existence of similarities would neither require nor permit of explanation, just as the existence of colors in our phenomenal world would not require an explanation. From our point of view the only significant problem is an experimental one and lies in determining whether or not certain similarities exist at all, and how far and in what directions they extend. If we succeed in obtaining accurate knowledge of the various conditions under which events or objects become similar for a given animal, we have learned a great deal about the factors determining its behavior. The existence of certain similarities implies that objects or events, no matter how different in other respects, lie in the same "dimension" or belong to the same "series," and to understand the behavior of an animal it is necessary to know these "dimensions."

In approaching the problem of similarity which is so closely linked up with that of equivalence, we have reversed the question which has dominated a great deal of research during the last decades, namely, the question as to how *similar* two objects or events may be and yet be discriminable. In employing the method of equivalent and non-equivalent stimuli, we have asked the question as to how *dissimilar* certain stimuli may be to be still identifiable. At first sight it may seem that a similarity displayed by heterogeneous stimuli is more difficult to define than a similarity between stimuli which are identical "in every respect" except one. We have previously insisted that this is not necessarily the case.[24] Furthermore, it is never possible actually to equalize conditions in every respect except one. Fisher,[25] in writing about the "design of experiments" from the point of view of a statistician, has recently formulated his views on this point as follows: ". . . it is only necessary to recognise that, whatever degree of care and experimental skill is expended in equalising the conditions, other than the one under test, which are liable to affect the results, this equalisation must always be to a greater or less extent incomplete, and in many important practical cases will be

[24] Klüver, *Behavior Mechanisms in Monkeys.*
[25] R. A. Fisher, *The Design of Experiments* (New York, 1935).

certainly grossly defective." It appears, then, as far as difficulties of interpretation are concerned, that it does not make much difference whether the investigator is dealing with stimulus situations as discussed by Fisher or with stimuli of a heterogeneous nature. In the following we shall briefly refer to a number of experiments pointing to similarities in very heterogeneous material.

(2) Max Wertheimer was probably the first one to approach the study of personality by way of *Zuordnungsexperimente* (matching experiments). In experiments of this kind the subjects are asked to "match" certain objects or events or, differently expressed, to tell which events "belong together." In some experiments I conducted in 1922-23, items of the following kind had to be matched: (1) geometric figures and colors; (2) geometric figures and sounds; (3) sounds and colors; (4) vowels and colors; (5) consonants and colors; (6) "meaningless" configurations of lines and colors; (7) visual movements and colors; (8) auditory rhythms and colors; (9) melodies and colors; (10) tastes and colors; (11) smells and colors; (12) geometric figures and geometric figures (13) vowels and "meaningless" configurations of lines; (14) sounds and "meaningless" configurations of lines; (15) the omitted beats of rhythms previously tapped and colors; (16) poems and geometric figures.

I shall not dwell on the results since in the meantime Arnheim,[26] Wolff,[27] and many others have published similar experiments. Vernon[28] has recently reviewed the literature and even presented statistical techniques for handling such data. From this work it becomes apparent that the factors for the "belonging together" of certain objects or events are not always easily defined. Let us take the last of the above-mentioned items (No. 16). The two geometric figures visible to the subjects were a circle (black outline drawn on white cardboard) and a circle of the same size with the contour interrupted by a few cross lines. Two different poems, let us say, I and II, were read aloud. It was found that fifty out of fifty-three subjects matched poem I with one figure and poem II with the other figure. The same consistency was obtained with another group of subjects,

[26] R. Arnheim, "Experimentell-psychologische Untersuchungen zum Ausdrucksproblem," *Psychol. Forsch.*, 1928, XI, 2.

[27] W. Wolff, "Gestaltidentität in der Charakterologie," *Psychol. u. Med.*, 1929, IV, 32; "Über Faktoren charakterologischer Urteilsbildung," *Zsch. f. angew. Psychol.*, 1930, XXXV, 385; "The Experimental Study of Forms of Expression," *Charact. a. Person.*, 1933, II, 168.

[28] P. E. Vernon, "The Matching Method Applied to Investigations of Personality," *Psychol. Bull.*, 1936, XXXIII, 149.

and here the poems picked for matching were English instead of German poems. In general, it may be said that the experimental material accumulated during the last years in various quarters is sufficient to demonstrate that there exist properties leading to "similarities" between the most diverse elements. To us it seems that progress can be made only by experimentally determining, in particular instances, the conditions under which these similarities appear.

Unfortunately, the trend has been to ascertain whether or not certain matchings are "correct" and to study the conditions affecting this correctness. The subjects may be asked to determine whether a given handwriting or a voice coming over the radio is that of a man or of a woman or whether the writer or the speaker possesses certain personality traits. However, the cases in which 100 per cent of the judges are wrong seem to be as important for psychological analysis as the cases in which they are right. In a sarcastic treatise on the claims of "physiognomy" written in the eighteenth century by Lichtenberg,[29] the author tells how he tried to picture the personality of the town-crier from the voice of the man whom he had heard for years calling out the hours of the night. When he finally met the man, this picture turned out to be wrong in every detail. But the psychological factors responsible for this "incorrectness" are just as worthy of note as those existent in case of "correct" judgments. In either case "similarities" are at work, and in either case the conditions responsible for their appearance should be determined. From our point of view a method of approach as used, for example, by Krauss[30] is promising because it does not concern itself with such things as "correctness" or "ability" to match.

(3) Closely related to the work just discussed are certain investigations which have at least this in common that they have focused our attention on properties apt to account for certain forms of equivalence otherwise difficult of explanation. We refer here on the one hand to the *Ausdruckswissenschaft* of Klages[31] and on the other hand to certain studies by Werner,[32] von Hornbostel,[33] Börn-

[29] *Lichtenberg's vermischte Schriften,* collected and edited by Lichtenberg and Kries (Vol. III; Göttingen, 1801), pp. 401-526.

[30] R. Krauss, "Über graphischen Ausdruck," *Zsch. f. angew. Psychol.,* 1930, Beiheft XLVIII, 1-141.

[31] L. Klages, *Vom Wesen des Bewusstseins* (Leipzig, 1926) and *Die Grundlagen der Charakterkunde* (Leipzig, 1928).

[32] H. Werner, *Einführung in die Entwicklungspsychologie* (Leipzig, 1926) and "L'unité des sens ," *J. de psychol.,* 1934, XXXI, 190.

[33] E. M. von Hornbostel, "Über Geruchshelligkeit," *Pflüg. Arch. f. d. ges. Physiol.,* 1931, CCXXVIII, 517.

stein,[34] Straus,[35] and Jaensch.[36] These studies contain extremely valuable suggestions for further work and throw light on the properties underlying phenomena as different as inter-modal reactions and synesthesia on the one hand and "physiognomy of language" (Werner) on the other hand.[37]

(4) In the extensive work on conditioned reflexes we find at every step forms of equivalence and non-equivalence. A conditioned response to one stimulus may "spread" to numerous other stimuli, a fact which Pavlov calls "generalization." I have previously shown[38] that the real problem does not lie in demonstrating the existence of "generalization" or "differentiation" but in accounting for the fact that "generalization" or "differentiation" occur along certain lines and within certain limits. It is apparent that Pavlov has not succeeded in determining the factors responsible for the equivalence and non-equivalence of stimuli which he found in his studies of conditioned reflexes and, in fact, has made very few attempts to do so.[39] In attempts along such lines it would be necessary to determine more closely the properties which become effective in "cessation" of stimulation, in sudden or gradual "changes," etc. Again, it may be necessary to determine whether change is effective only if the something which is changing has certain properties and not others. In this connection we call attention to the comments of Straus[40] on this phase of Pavlov's work. What is called "generalization" or "irradiation" is, of course, closely related to what psychologists have termed "transfer of training." The kind of experiments necessary for elucidating the forms of equivalence arising from transfer are essentially the same as necessary for an understanding of Pavlov's "generalization." In passing we mention that an interesting form of "generalization" has recently been reported by Pannhorst,[41] who utilized post-hypnotic suggestions to obtain certain reactions. After a few

[34] W. Börnstein, "Über die funktionellen Beziehungen der Sinnesorgane untereinander und zum Gesamtorganismus," *Ned. Tijdsch. Psychol.*, 1933, I, 331.

[35] E. Straus, *Vom Sinn der Sinne* (Berlin, 1935).

[36] E. Jaensch and I. Meier, Über Synaesthesien und damit zusammenhängende Persönlichkeitsmerkmale," *Grundformen menschlichen Seins* (Berlin, 1929), pp. 425-476.

[37] See also K. Bühler, *Ausdruckstheorie* (Jena, 1933) and *Sprachtheorie* (Jena, 1934).

[38] Klüver, *Behavior Mechanisms in Monkeys*, pp. 344-349.

[39] I. P. Pavlov, "The Conditioned Reflex," *Setchenov J. Physiol.* USSR, 1935, XIX, 299.

[40] E. Straus, *Geschehnis und Erlebnis* (Berlin, 1930) and *Vom Sinn der Sinne* (Berlin, 1935).

[41] R. Pannhorst, "Beitrag zur Klinik der bedingten Reflexe," *Nervenarzt*, 1932, V, 185.

sessions the same reactions were obtained from an hypnosis in which no post-hypnotic suggestions of any kind were given.

(5) If we say that certain objects or events have a certain "similarity" we are likely to forget that the similarity we are dealing with is a similarity "perceived" or "reacted to" by some organism. The similarity exists, of course, only with reference to a certain organism and certain states in this organism. Yet we frequently take the attitude that the observed similarity exists independently in the *objects*. That there is not such an independence is more easily recognized when dealing with "higher" functions. In thinking, for instance, we may isolate or "abstract" one property or characteristic from a set of widely different items, no matter whether these items exist as events in the sensory or in the "imaginal" field. The abstractive process is also not independent but has reference to some material which has certain characteristics. A similar interdependence of relations and relata was also found in analyzing responses to sensory stimuli.[42]

If for a given animal a group of widely different stimuli is equivalent, we do not know whether the existing differences are ineffective because under the conditions of the experiment only a common factor is effective or whether the differences do not exist at all for the animal. In other words, further experimentation must settle the question whether these differences can be made effective at all. To go from one form of equivalence to another means to shift from one property or characteristic bringing about equivalence to another. The number and kind of shifts an animal is capable of undoubtedly tell us something about the complexity of its organization. "Abstraction" constantly destroys similarities and constantly creates new ones. It is the task of the experimenter to determine the properties or characteristics in terms of which the abstraction is made.

From this point of view many investigations in the field of psychology and pathology of language and thinking throw new light on the problem of equivalence and at the same time show the necessity for determining more closely the factors involved in processes of "abstraction" or "categorical" thinking.

Of special importance in this connection are certain researches in which patients with cerebral lesions were studied in considerable detail. We shall refer here only to the work of Gelb and Goldstein on

[42] Klüver, *Behavior Mechanisms in Monkeys.*

aphasia.[43] What is, according to them, the defect in cases of amnesic aphasia? To be sure, there is a speech defect; but if, for example, several different objects are put before the patient, and he is asked to sort them and put them in order, it appears that the way he classifies them shows also deviations from the normal. In such a way a large number of functions apparently unrelated to speech may be analyzed. The patient may fail in certain tasks and do quite well in apparently closely related problems. Yet if the different disturbances are examined they all point to one basic defect, to a disturbance of what the authors call the "categorical attitude." The attitude of the patient has become more "concrete" and more "primitive." Certain abstractions are impossible. The inability to find words is only *one* aspect of this basic change. The same words which are available for concrete situations are not available as signs for something. The authors assume that "having language in its significative aspect" and "categorical attitude" are an expression of the same basic attitude. Weigl,[44] Rothmann,[45] and many other investigators have also attempted to bring out disturbances in such *Grundfunktionen.*

It is of interest that in the work of Gelb and Goldstein a systematic attempt was made to determine the factors underlying the similarities and dissimilarities in the patient's world. It is also significant that these investigators did not stop with an examination of language to determine the factor responsible for the inability to find certain words. *"On peut dire en ce sens que la tâche véritable de la pathologie du langage commence au point précis où cesse l'étude exclusive du langage."*[46] Whether Gelb and Goldstein are right in their interpretation of a general factor underlying all specific disturbances is, however, still controversial matter.[47] To us the most

[43] A. Gelb, "Remarques générales sur l'utilisation des données pathologiques pour la psychologie et la philosophie du langage," *Psychologie du langage* (Paris, 1933), pp. 403-429; A. Gelb and K. Goldstein, "Über Farbennamenamnesie," *Psychol. Forsch.,* 1925, VI, 127; K. Goldstein, "Die Lokalisation in der Grosshirnrinde," *Handb. d. norm. u. path. Physiol.,* 1927, X, 600-842; K. Goldstein, "L'analyse de l'aphasie et l'étude de l'essence du langage," *Psychologie du langage* (Paris, 1933), pp. 430-496.

[44] E. Weigl, "Zur Psychologie sogenannter Abstraktionsprozesse. I. Untersuchungen über das 'Ordnen'," *Zsch. f. Psychol.,* 1927, CIII, 1, and "Zur Psychologie sogenannter Abstraktionsprozesse. II. Wiedererkennungsversuche mit Umrissfiguren," *Zsch. f. Psychol.,* 1927, CIII, 257.

[45] E. Rothmann, "Untersuchung eines Falles von umschriebener Hirnschädigung mit Störungen auf verschiedensten Leistungsgebieten," *Schweiz. Arch. f. Neur. u. Psychiat.,* 1934, XXXIII, 35, 228.

[46] Gelb, *op. cit.*

[47] L. Bouman and A. A. Grünbaum, "Experimentell-psychologische Untersuchungen zur Aphasie und Paraphasie," *Zsch. f. d. ges. Neur. u. Psychiat.,* 1925,

important fact apparent from the recent literature is that progress will be made only by analyzing certain aspects in more detail. For example, if a patient hears sounds but does not understand their meaning and thus fails to understand words, the question arises whether or to what extent he actually hears the sounds. In this connection Pick has called attention to the importance of factors such as intensity, pitch, and intonation. For example, does an equivalence exist even when the sounds differ greatly in intonation? The problem here is essentially the same as in the above cited investigation of Sarris.

(6) We previously indicated that we cannot assume that the "outer field" with its properties is simply projected into the organism, just as if the existing similarities and dissimilarities were photographed. Many investigators have recently emphasized the active rôle of the organism. Stein[48] in his treatment of normal and pathological perception tries to overcome the difficulties of von Kries as regards similarity by recourse to the "virtual movements" of Palágyi.[49] According to him these "virtual movements"—we cannot enter into a discussion of Palágyi's views at this point—furnish the "partial identity" von Kries was looking for. Von Weizsäcker[50] has for years insisted on the intimate relations between perception and movement. If we try to examine an object in the dark by the sense of touch, it may be said that the touch sensations "cause" or guide the movements and that the movements "cause" the touch sensations. The truth seems to be that there is a circular relation, a *Gestaltkreis,* as von Weizsäcker calls it. Buytendijk[51] in studying time relations of movements in films of animal fights believes that in such instances it is equally impossible to separate "stimulus" and "response."

(7) At random we shall mention a number of phenomena which in recent years received a great deal of attention, especially in psy-

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XCVI, 481; K. Goldstein, "Kritisches und Tatsächliches zu einigen Grundfragen der Psychopathologie, im besonderen zum Aphasieproblem," *Schweiz. Arch. f. Neur. u. Psychiat.,* 1934, XXXIV, 69, 230; A. A. Grünbaum, "Aphasie und Motorik," *Zsch. f. d. ges. Neur. u. Psychiat.,* 1930, CXXX, 385; M. Isserlin, "Die pathologische Physiologie der Sprache," *Erg. d. Physiol.,* 1929, XXIX, 129; M. Isserlin, "Über Sprache und Sprechen," *Nervenarzt,* 1932, V, 1.

[48] J. Stein, "Über die Veränderung der Sinnesleistungen und die Entstehung von Trugwahrnehmungen," *Handb. der Geisteskrankheiten,* ed. Bumke, I, 352-426.

[49] M. Palágyi, *Wahrnehmungslehre* (Leipzig, 1925).

[50] V. von Weizsäcker, "Was lehrt die neuere Pathologie der Sinnesorgane für die Physiologie der Sinnesleistungen?" *Zsch. f. Sinnesphysiol.,* 1933, LXIV, 79, and "Leistung, Form und Menge in der Lehre von den nervösen Funktionen," *Nervenarzt,* 1931, IV, 433, 526.

[51] F. J. J. Buytendijk, *Reaktionszeit und Schlagfertigkeit* (Kassel).

chopathology. All of these phenomena involve or are closely related to forms of equivalence. As far as their experimental analysis is concerned very little has been done. We have reference to phenomena such as "identification," "sphere," "*Schema,*" "projection," "determination," and "contamination."

(8) Finally, we shall call attention to certain forms of equivalence which have been very carefully investigated and analyzed. These are the "constancy" phenomena analyzed by such men as Hering, Katz, Gelb, Kardos, and others. These phenomena are found in animals as well as in man. There exists a constancy of color, a constancy of form, and a constancy of size in the visual field, and there are similar phenomena in our reactions to auditory, thermal, and weight stimuli. Even the investigation of language has supplied constancy phenomena,[52] and future research is likely to discover such phenomena in other fields as well. In studying the reactions of chromatophores in fishes and the ensuing adaptation in pattern, Mast[53] found that *different* configurations in the retina, no matter where located, may all result in the *same* configuration in the skin. He remarks: ". . . if the pattern in the skin depends upon the spacial interrelation of the impulses, their interrelation must be reorganized somewhere between the retina and the skin, probably in the brain." Rashevsky[54] has recently dealt with the physico-mathematical aspects of constancy of form. Apparently the various phenomena of constancy represent, to use H. Fischer's expression,[55] "iso-functions" of the organism on the behavior level.

The method of equivalent and non-equivalent stimuli is one of the methods which may be used in studying personality. To insist that this method is fruitful is not meant to deny the value of other methods. In fact, any analysis by this method presupposes the utilization of numerous other methods and techniques. In the present paper we have been interested only in the possible application of this method in the field of personality and not in a formulation of a theory of personality.

[52] Bühler, *Sprachtheorie.*

[53] S. O. Mast, "Changes in Shade, Color, and Pattern in Fishes, and Their Bearing on the Problems of Adaptation and Behavior, with Especial Reference to the Flounders *Paralichthys* and *Ancylopsetta*," *Bulletin of Bureau of Fisheries,* 1914, XXXIV, 173.

[54] N. Rashevsky, "Physico-Mathematical Aspects of the Gestalt-Problem," *Phil. Sci.,* 1934, I, 409.

[55] H. Fischer, "Die Bedeutung der anorganischen Ionen für die normalen und pathologischen Lebensvorgänge (speziell für Erregung und Lähmung)," *Schweiz. Arch. f. Neur. u Psychiat.,* 1932, XXVIII, 1.

THE PERSONALITY OF THE KAINGANG INDIANS*

JULES HENRY
Columbia University

The personality of the Kaingang Indians[1] cannot be understood apart from the social structure in which it had its being, for the development and functioning of that personality is so correlated with the peculiar structure of Kaingang society that any attempt to describe the one without the other would produce a confusing picture. In order to show, therefore, how the personality of these Indians integrates with the processes of their society it will be necessary to give first a short sketch of the social structure.

The Kaingang are divided into extended family groups of from fifty to three hundred individuals which live by themselves, coming together principally for fiestas, invitations to which may not be refused, though they were often pretexts for mass murder of the invited guests. These groups are endogamous, and their small size makes the degree of inbreeding within them extremely high. The incest taboos are so reduced that the only relationships within which marriages do not take place are between parents and real children[2] and between full siblings.[3]

Although the Kaingang extended families are endogamous, they are so not by virtue of specific regulations that make marriages between the groups taboo, but because of the annihilating feuds that have existed among them for at least three hundred years. Correlated with these feuds is the sharp distinction in behavior towards members of one's own group and those of other, or, as the Kaingang

* The field work that forms the basis for this paper was done under the auspices of Columbia University.

[1] The Kaingang Indians are one of a group of tribes bearing the same name that inhabit the highland forests of southeastern Brazil and Uruguay. The group that was the object of my investigations during the years 1932-34 are nomadic hunters who live entirely upon game and wild fruit.

[2] Marriages between parents and step-children were not uncommon.

[3] Marriages between half-siblings, although rare, did take place and were accepted socially.

call them, "different," groups. Within each group a high degree of positive affect is developed on the basis of libidinal ties that are extended to include a large number of people, but between the groups no such ties are developed. Between the feud groups there is nothing but fear and rage; murder, pursuit, and flight. It is true that some marriages do occur between the groups, but they are few and never prevent the relentless prosecution of the vendettas. Thus, the first point to be considered in a description of Kaingang personality is *the nature of the libidinal ties within the extended families and the manner of their development.*

Libidinal Ties

The attachments of Kaingang children are not confined to their immediate family but are diffused throughout the extended family group through a number of processes. When their mothers leave camp on some errand, the babies are taken care of by some woman[4] who happens to be around, and if the child grows hungry or cries while its mother is away the woman taking care of it will give it the breast. The Kaingang are very fond of children, and even childless individuals of all ages caress them constantly and take them to bed. The children themselves love all this attention: they are at the beck and call of anyone who wants a warm little body to caress and they lie like cats absorbing the stroking of adults. They are impossible to keep track of around the campfire: by choice and from necessity they literally "sleep all over the place." They like to cuddle next to the adults, and in the winter when there may be only one blanket to shelter a family, the little ones are driven to crawl under the cover of someone else, who welcomes the additional warmth of the little bundle.

When the children are very young they are the objects of adult affection, but when they are about fourteen or fifteen they turn their attention to one another. At this point a striking difference is noticeable between the behavior of the adolescent boys and that of the adolescent girls, for the young men participate in certain warm relationships which are not duplicated by the young women. The young men love to sleep together. At night they call to one another, "Come and lie down here with me, with *me*!" Then there is a shifting and a wriggling so that Nggugn or Waipo or Kanyahe can lie down where he is bidden. In camp one sees young men caressing. Mar-

[4] Since each camp is generally composed of close relatives, this woman is often a close consanguinal or affinal relative.

ried and unmarried young men lie cheek by jowl, arms around one another, legs slung across bodies like lovers in our own culture. Sometimes they lie caressing in little knots of three and four. However, I have never seen any signs of complete homosexual relations among the men or the women. I have sat talking night after night to knots of young men, and I have seen them caressing one another in absolutely open fashion in the broad light of day, but I never saw them make a more definitely homosexual gesture. In the whole mass of Kaingang folklore there are only two very short tales of homosexuality. One is about a homosexual relationship between two men; the other tells of a male supernatural that was killed by a man because it sodomized him by trickery. Outside of this I never heard the Kaingang allude in any way to homosexuality.

Like the indiscriminate playing of children these caressings and sleeping parties do not follow kinship lines. Whatever may be the specific obligations of cousins or brothers-in-law they are completely lost sight of in these ephemeral, wholely casual and whimsical masculine contacts. The basis of man's loyalty to man within the extended family has roots in the many warm bodily contacts among them. The violent, annihilating conflicts among men in Kaingang society are all among those who never shared the languid exchange of caresses on a hot afternoon under the green arched shelter of a house nor lain together night after night under a blanket against the cold. The very transient, unfixated nature of these contacts leaves no grounds for jealousy. The relationships built upon these hours of warm affectionate lying together with anyone at all bear rich fruit in the softening of conflicts that spring up among the men.

Positive affective ties are multiplied within the extended family, not only through the widening of the babies' circle of affection and through the caressing among the young men, but also through relationships among the men and women. Although affairs both before and after marriage are numerous, their significance is quite different in character from the majority of similar relationships in our own society. Even though these affairs are characterized by a peculiar absence of jealousy except on the part of betrayed spouses, once a Kaingang man and woman have been lovers a tie is established between them that is never forgotten, and in times of emergency or great conflict they may come to each other's aid. But love affairs have an even wider implication. People whose mothers have had the same lover look upon one another as siblings, and men frequently

view other men's children as their own because the mothers have been their mistresses. In this way the concepts of fatherhood and siblinghood become extremely broad within each extended family so that this group which lives and hunts together and which is already closely inbred, becomes further united through a strong sense of being one family of parents and children.

The stimulus toward active sexual life which makes this type of feeling possible is provided at a very early age, for not only do the children hear the constant jocular sexual chatter of their elders, but they are directed to intercourse by their own parents. The sexuality of little boys is stimulated by their mothers' manipulation of their genitals before they can walk. Although little children of two and three are told jocularly to copulate with one another, their attention is directed particularly toward adults. Babies are told jocularly to copulate with people anywhere from ten to twenty times their age, and a toddler of three has already learnt to say, "With Waikome," (who may be his grandfather's sister) in answer to the question, "With whom do you copulate?" Children of all ages are pressed into service to remove ticks, and it is not at all uncommon to see a little girl of five or six hovering over a supine man picking the ticks off his genitals. A child soon learns to repeat the jokes that go around the campfire, and at an early age becomes the butt of certain kinds of sexual jokes himself. A boy of nine is jokingly taunted with masturbation, told that he has deflowered his fifteen-year-old cousin, or is accused of wishing to copulate with a dog. As two dogs copulate, the entire hunting party roars with laughter and a little girl of six cries delightedly, "They are copulating!" The children may see the boisterous open foreplay of the adults and glimpse the sexual act in the dim light of the early morning. Yet with all this there is no intercourse among children. Jokes about love affairs of children among themselves are never made by adults or by the children. In this society in which gossip about affairs is constant, where jokes about every aspect of sexual relations are forever being made, where children are directed to copulate, where the foreplay of adults is easily visible, there is never a joke about actual intercourse between two children, and they are never seen engaged in sexual foreplay. They receive a great deal of satisfaction from adults and do not bother with one another. But this adult attention often culminates in the sexual experience to which the grown-ups are eager to introduce the child, who is generally enjoyed first by a person much

older than he. This is his introduction to a life of sexual philandering that does not end even with marriage. By the time he is fifty the average Kaingang will have had an affair with most of the adults around him.

The extension of the libidinal ties that are developed through the numerous heterosexual relationships is facilitated through the sexual aggressiveness of both men and women. In our society where men are conventionally the aggressors in sex the whole sexual process from courtship to consummation is delayed because the advances must always be made by one person. In Kaingang society, however, where no emphasis is laid upon such a temperamental difference between the sexes, where the same jocular and often violent sexual aggressiveness is permitted to boys and girls, to men and to women,[5] affairs can be begun and consummated much more rapidly and often. Sexual approaches range all the way from the unobtrusive contact of bare legs beside the evening fires, to the open, ribald and aggressive onslaughts of both men and women. Although I never put it to the test, I have a strong feeling that widowed Kundídn, like many of her sex, was stronger than I. Her amorous pinches, punches, and pushes were a trial to me once they had become archived in my scientific consciousness. One day she said to me, "Don't you ever have coitus?" "No," said I, "I have no penis." "That's a lie. I saw it. If I sent someone to you would you copulate with her? Go along through the bushes and I will send someone after you!" Kundídn's aggressiveness stopped only at direct snatches at the sexual organs.

Anggló, a married woman who was having a passionate affair with Kanyahé, was not averse to pressing another suit on the side. While she was much sweeter and did not square off in the boxer-like manner of Kundídn, she was aggressive enough in her own mild way. She did not pinch so hard nor call so loudly, but if there was no one around, her quiet "I should like to talk to you and see the inside your house" would set me thinking of how I could best avoid her without hurting her feelings. But I might have spared myself much worry on that score, for in this society, which lays no stress upon man's aggressiveness as over against woman's passivity, a woman who makes advances feels no vindictive anger at a repulse. In our

[5] The terms for intercourse can have both masculine and feminine objects. The English vulgarisms can take only feminine objects, thus showing in the very structure of the language our feeling that the male is the active agent in intercourse.

society a woman who temporarily steps out of her culturally decreed rôle of the attacked to become the attacker feels shame that quickly becomes resentment against the desired object if she is rebuffed. The shame that she feels at reversing her part in the drama of the sexes is forgotten if she obtains her desire, and turns to anger if she does not. But the Kaingang women are able to make the same jocular approaches day after day without a change of attitude.

This, then, is the character of the libidinal ties among the Kaingang and the manner of their development. From his earliest days the growing child is passed from one caressing adult to the other. From the moment he understands what is said to him the terms for sexual intercourse are forced upon his mind, drenched always in laughter. His own mother jocularly directs him to intercourse while she nurses him and plays with his little body, and day after day he listens to tales of intrigues in which he knows that he himself will someday share. In this way the foundation is laid for an active, cheerful, and diffuse sexual life.

In our society, where tradition has placed a limit on sexual activity by condemning aggressiveness in women, the sexual process is delayed. In our society, again, but particularly in some primitive societies, whole categories of relatives are excluded as sexual objects by rigorous laws of incest, so that even an enterprising person does not think sexually of close relatives. But the Kaingang know nothing of the sexual dichotomy of the aggressive male and the passive female, and laws of incest bear little weight with them. They view all people except children as spontaneously, vigorously and diffusely sexual, and act accordingly.

The result of the multiplication of libidinal ties of every kind is to draw together all the members of each extended family into a closely knit, sheltering unit within which murder never occurs. Quarrels arise over unfulfilled obligations and the endless adultery, but no blood is ever shed within the extended families. All conflicts within them are resolved on the basis of the warm relationships that have been build up since infancy.

Inter-Group Attitudes

The most striking thing about the Kaingang is the complete difference in feeling between members of the same extended family and members of "different" groups. Members of different groups do not fondle one another's children; the men of the different groups

do not caress one another; and the numerous love affairs that are so important in the welding together of each extended family simply do not exist between them. Thus the processes through which warm bonds are established do not operate between the groups. Coextensive with this difference in the affective picture are the relentless feuds, so that it may be said that there is a correlation between the break in positive affective ties and the existence of vendetta.

An important trait of the Kaingang personality is projection. Within the groups this projection takes the form of attributing to others resentment against oneself for offenses one has committed. The offenses that serve most generally as the basis of this projection are adultery and failures to assist others in hunting. This projection is not only experienced but is acted upon and produces constant quarrels, yet it never results in murder. Diagrammatically it may be expressed as follows:[6]

What I think	*What I think the other fellow thinks*
(1) I have failed in my obligations to him and have meddled with his wife	(3) You have failed in your obligations to me and have meddled with my wife
(2) and I feel guilty	(4) so I am angry with you.
(5) If you are angry with me I'll be angry with you too.[7]	

Feeling angry, the Kaingang precipitates a quarrel, particularly if he is drunk.[8] Thus, on the basis of the resentment that A thinks that B feels, A picks a quarrel with B.

The mechanism of projection which produces bloodless brawls *within* the extended families precipitates murder *between* them. To the Kaingang everything, human or non-human, that lies outside the limits of his extended family is a threat, and those threats that loom largest are other extended families and the supernatural. The Kaingang sleep fitfully at night for fear of attacks by vendetta enemies, and the man who enjoys the greatest prestige among them is the one who can do with the least amount of sleep at night. Whenever two extended families, or a few men from two different families, meet by chance in their wanderings through the forests they are in acute terror of an attack from one another. They may wander

[6] Read in numerical order. The wording is my own.
[7] The Kaingang always react to anger with anger.
[8] The Kaingang make an intoxicating drink out of honey.

around together for weeks or even months, but sooner or later there is a murderous outbreak, and always the one who strikes first wins. It is evident from the many feud stories that in such situations the Kaingang go through a definite projection cycle, which may be diagrammed as follows:

The Vicious Circle

My own extended family	*Outside of my extended family*[9]
(1) My extended family gives security.	(2) Everything outside threatens.
(3) I am in constant danger of destruction	(4) and I must take action against the threat.
(5) Contemplating action, I	(6) project: "The other person fears me because he knows what is in my mind."
	(7) He fears and therefore wishes to destroy me.
(8) I must take action to prevent it.	

The meaning of (5) is simply that since A feels himself in danger of attack he wishes to attack first. Wishing to attack, he imagines that his victim knows his thoughts and may try to murder him at any moment. This situation has an obsessive character, the dramatic intensity of which it is difficult to overestimate.

This projection cycle has, of course, a certain basis in the realities of the actual conditions. The families *are* mutual enemies, who for many generations have lived in fear and hatred of one another. "When will the blow come?" they ask. "Who will be first to strike?"

When the terror-driven Kaingang at last take action against the threat by attacking their vendetta enemies, they are left with a feeling of guilt. It is no abstract sense of inherent wrong in killing that gives rise to the feeling of guilt which the Kaingang experience after slaughtering their vendetta enemies. The intermarriages, few as they are which take place among the extended families, make the members actually relatives to one another, so that it is impossible to wipe out a family without killing off a number of one's relatives by marriage and even blood kin. Thus the members of the victorious families frequently fall to quarreling after the slaughter, accusing one another of having been responsible for these killings of relatives,

[9] Read in numerical order. The wording is my own.

which they had all planned together and in which they had all participated. The annihilation of the family of a certain old man called Patklé produced such strong feelings of guilt among the members of the victorious family that a general quarrel ensued. Patklé had been related to Kanyahé, the principal old man of the victorious group, and this relationship formed the central issue of the quarrel. After some of the assassins returned from their unsuccessful pursuit of one of their victims who had been lucky enough to escape the holocaust, Kanyahé burst out, "Let him die alone.[10] You killed my affinal relatives and so stop your slaughter." To which one of the pursuers replied, "It was you yourself who ordered me to kill them; and now you are angry with me!"

It is not enough that the Kaingang should feel guilt about the people they have killed, but they must feel guilt because their own close relatives, members of their own extended families, have been killed by others. They sometimes feel that their relatives have died because they were not there to protect them. Kuthúgn and Koví went hunting together and separated, and when Kuthúgn returned he found Koví dead; for while Kuthúgn was away, Koví had been overwhelmed by vendetta enemies and killed. On the following day Kuthúgn met one of his relatives and asked him, "Well, what happened?" "The enemy killed him." Kuthúgn became angry when he heard this and said, "Now! I said to him, 'Stay here,' but he went on and the ("different") things killed him." What had actually happened was that Kuthúgn had told Koví to chop out a beehive and had gone on, leaving Koví alone, so that his complaint that Koví had not done what he was told is nothing more than an excuse to conceal his own sense of responsibility for Koví's death.

The sense of guilt that oppresses the Kaingang is sometimes, as in the quarrel of Kanyahé and his relatives, absorbed into the extended families and digested in undercurrents of resentment, but in other cases it finds expression in outbursts of anger, such as that of Kuthúgn in the last instance, which are rooted in a sense of personal guilt.

Factors Contributing to the Perpetuation of the Feuds

Now vendetta is a common enough feature of human society, but in many places where it exists there is some social device for stopping the killings at least temporarily. One of the common ways is the *lex talionis,* whereby for every man killed one man from the

[10] The Kaingang way of saying, "Don't kill him, let him die from other causes."

murderer's group must also be killed. But in Kaingang society there is no way at all of bringing the vendettas to a halt except through extermination of the men of the enemy group. A number of factors contributed to the existence of this condition. The first is the obsessive personality structure just described which makes impossible the acceptance of the *lex talionis*. From time to time men have arisen in Kaingang society who were willing to accept the law of an eye for an eye and tooth for a tooth, but such a socially salutary attitude[11] was incompatible with the obsessive drive toward mass murder that characterized their fellows, so that in the end the ones who had their way were those to whom total destruction of the enemy families was the only solution of the conflict. Pepó, one of the men in a Kaingang feud, was satisfied to live in peace after having killed his brother's murderer. His nature was completely satisfied by the death of one man. But Wainló, the foster son of Pepó's brother, could never forget the murder of his foster father. For years he nourished his hate until with the help of allies he killed all the men of the original murderer's group. Thus the *lex talionis* could not function in this instance because it was repugnant to the obsessive personality of Wainló. But the peculiar character of Kaingang society was given it by its scores of Wainlós, not by its Pepós, and these obsessive individuals worked not only for the destruction of others, but also for the destruction of themselves, for their very obsession with murder made them disregard all odds and plunge themselves into a fight in which the numbers were so overwhelmingly against them that they had no chance of coming out alive. Pandjumbúgn is an excellent example of such an individual. He was alone in an enemy camp, and although his hosts were perfectly willing to accept him, he became so bent upon their destruction that, although they were unwilling to do so, he literally forced them to kill him.

A second factor in the perpetuation of the Kaingang feuds is their feeling that once a feud is started it can never be stopped. In the realm of the supernatural this finds expression in their ideas about the souls of the deceased and in their terror when one of their number dies. The Kaingang fear that the soul of the deceased desires to carry off its relatives is in part an expression of the feeling that when death has struck once it will keep on striking. Paralleling this on the human level is the belief that a feud enemy will never

[11] Purely from the point of view of the effect this would probably have had on Kaingang society.

cease his murders, that he can never be trusted and hence can never become a friend.

One more important factor in the perpetuation of the Kaingang feuds is their function as a drain to the tremendous aggressiveness of the Kaingang, which manifests itself not only in attacks on the Brazilian colonists and in the slaughtering of one another, but even in the utterly wanton gashing of trees and the killing of the tiniest bird that happens to perch on a limp where stick or stone might reach it. The feuds also act as a drain to the resentments that arise from the desertion of hunting companions, from adultery, and from the guilty accusations following feud massacres. In this latter instance, however, the Kaingang are really moving in a vicious circle, for this hostility needs to be released in new slaughters, which in turn cause new feelings of guilt and produce new quarrels.

FOUR YEARS OF CHILD GUIDANCE IN A SCOTTISH CITY

NORMAN T. WALKER
Aberdeen Child Guidance Clinic

This paper presents an analysis of four years' experience in child guidance carried on in a representative Scottish city of some 170,000 inhabitants. The community is fairly self-contained, and the population is very homogeneous. There is relatively less unemployment than in cities of comparable size where industry is more specialized.

The staff of the clinic is entirely part-time. It consists of two psychologists, a physician, a consulting pediatrician, and a social worker. Regular sessions are held once a week within the university buildings, and interviews are granted at other times by appointment.

Differences in Sex, Intelligence, Age

On analyzing the two hundred cases dealt with, the first significant fact which emerges is that boys exceed girls in the proportion of six to four.

All grades of intelligence are represented; but the dull and backward outnumber the bright by about six to one. A little under a third of all the children tested fall into the I. Q. range, 90 to 110. These figures, however, do not in themselves indicate that dull children are more likely to be problem children than bright children, in the sense of being delinquent, or difficult to manage, or temperamentally unstable. For our experience in Aberdeen, as elsewhere, is that a large number of dull children are referred to the clinic by school authorities on account of educational backwardness, special or general, and not because of any added difficulty of temperament or behavior. It does seem true, however, that a child intellectually dull has more difficulty in adjusting himself to the social environment (at home and outside) as well as to the environment of school. The school difficulties seem to arise mainly because teachers and headmasters still fail to appreciate fully the educational significance of individual differences in inborn ability.

In regard to age, some interesting facts emerge from the analysis. While the range is from three years to over twenty years, the incidence at the different ages is far from being uniform. There appear to be two critical age periods, namely, from 6 to 8 and from 13 to 15, or roughly the beginning and end of the school period. The first triennium (6 to 8) accounts for nearly a third of all the cases, and the other (13 to 15), for nearly a quarter. The first represents the period of adjustment to school and covers the transition from infant to junior department. The second is the adolescent stage with its attendant difficulties and disturbances in the emotional life. It is perhaps unwise to stress overmuch the increase in the frequency of cases from 6 to 8, for the reason that it is the school that sends most of the children to the clinic, and the child under 5 is not yet at school. But the 13 to 15 increase seems to indicate a significant and not a chance increase.

Home Environment

Considering next the family histories and domestic circumstances of the children attending the clinic, we encounter some obviously significant facts. For example, 33 of the cases represent "only" children, and another four are children who were only children for an appreciable period before the birth of the next child in the family. The percentage is high and is probably significantly higher than the incidence of only children in the population of non-problem children. Of course cases here reviewed, exactly one in six is an only child; and if we add the four eldest children separated by a number of years from the next arrival, the total percentage is nearly 19. Our experience suggests the potential value in these cases of the nursery school, both as a means of introducing the only child to the society of his contemporaries and also as a therapeutic agency in the treatment of only children of pre-school age who are "difficult." We have, in fact, had occasion to utilize the services of the one nursery school in Aberdeen in both those ways.

Next comes the problem of the step-parent. Comparative statistics are again lacking; but among our patients there were 17 cases of step-parents—7 stepmothers and 10 stepfathers. The numbers are too small to make generalization safe, but, taken for what they are worth, the figures lend no support to a belief that a stepmother is more harmful than a stepfather.

In addition to these cases, there were 13 instances of foster-parents (5 boys and 8 girls); and 7 cases of children living in insti-

tutions (all girls). Again it would appear that girls suffer more than boys from disturbance of the normal family relationships; but our numbers are small and, as it happens, no boys' institutions sent cases to the clinic.

Illegitimate children numbered 16 (6 boys and 10 girls)—a percentage of 8, or roughly 1 in 12. In some instances it was only too apparent that the child was an "unwanted" child. Stealing and bullying were the compensations sought for lack of parental affection.

The presence of parental discord was noted in 23 cases, or about 1 in 9, and in five of these there had been actual separation. Such want of harmony in the parental relationship is one of the most certain causes of maladjustment in children. The child misses that background of emotional security, which often enables him to solve his own conflicts and effect readjustments when difficulties arise in school or at home. This factor should, therefore, be one of the first to receive tactful exploration by psychologist and social worker in the practice of child guidance.

The position of the child in the family where there are several children is, it would seem, not a matter of indifference. Out of 103 children from families of three or more children (average 4.7), 29 were oldest children as against a chance expectation of 22. Thus the first-born would appear to present more difficulty in upbringing than succeeding children. Parents experiment more in the case of their first child owing to lack of experience, and tend also to direct too much attention to him. The child, in turn, has often a difficulty in accommodating himself to the birth of the next child.

According to the same reasoning the youngest child fares better than intermediate children, the number of youngest children being 16, as against a chance expectation of 22.

One last point worthy of mention under this heading is that in 15 of our cases one or other of the parents was dead, leaving widow or widower to bring up the family. In 10 of these cases the dead parent was the father, the normal breadwinner.

The Problems

The problems bringing children to the clinic admit of no easy classification. In many cases the problem is a mixed one. The most numerous in our records are those concerned with scholastic backwardness in one form or another. They are among the easiest to diagnose, but are more difficult to treat. The cause in the majority of instances is poor general intelligence (I. Q.'s between 70 and 85.).

Such dull and backward children are ill-provided for in the ordinary school. Too intelligent for the special school, they have yet too little ability to keep up with the pace of the average pupil. There is urgent need (1) of more adequate recognition of the problem itself and (2) of more adequate provision for dealing with it by means of tutorial classes or schools for the backward or other suitable means.

Misbehavior of one kind or another was the problem in one case out of seven, and if we add "being out of control," the percentage rises to nearly 20.

Next in the list come cases of speech difficulty, generally involving stammer. Twenty-one children have been brought to the clinic on this account, and although this number is far below the known cases in the schools, there is no reason to doubt that it represents a fair sample. The most striking fact is the overwhelming predominance of boys, in fact, twenty boys to one girl.

As this is a condition which presents considerable difficulty in treatment, a more detailed analysis of the cases may be given. The group tends to be above rather than below average in intelligence, though different grades are represented. About a quarter of the cases are only children; and the presence of a step-parent occurs thrice. In 4 cases (out of 21) there is an indication that the disability occurred in the ancestry. Fright of one kind or another is recorded in half of the cases, in several instances following or attendant on surgical operation. In one case the child was illegitimate and clearly unwanted; and in one case the condition was diagnosed as being due to jealousy of a younger sister, the patient (a boy) having been an only child for the first seven years of life. These findings are in accord with the accepted view that stammering is of psychological rather than physical origin and calls for psychotherapeutic treatment; hence the need for speech therapy centers as a regular part of our educational service.

Temperamental disturbances, resulting indirectly in stealing, truancy, and being out of control of parents or guardians, account for a large proportion of cases.

Vocational guidance was sought and supplied in thirteen instances and educational guidance in five. There were two cases of deaf mutism and three of enuresis.

Sex Differences

Sex differences are apparent, as already noted, in the total frequencies of boys and girls, but are not so marked in age distribution. For both sexes the critical periods are the same, from 6 to 8 and

from 13 to 15. Girls brought to the clinic and tested for intelligence have a lower median I. Q. (84) than boys (91.5), but little significance attaches to the difference in view of the small number of cases. Scholastic backwardness accounts for roughly a third of each sex. Misbehavior is reported relatively more frequently among girls, temperamental disturbances among boys. Stammering is predominantly a boy's complaint. Seven boys and six girls sought vocational guidance; three boys and two girls, educational guidance.

Causation

In the causation of children's problems, home conditions are the most important. Domestic disturbance lies at the root of almost one-third of the cases. This heading includes unsatisfactory social environment, faulty treatment by parents (e.g., over-severity), illegitimacy and its accompaniments, and parental discord. In other eighteen cases, spoiling by one or other of the parents was noted, the children concerned being almost invariably boys. Low intelligence accounted for most of the cases of educational backwardness, but not for all. Poor heredity was thought to be a causative factor in 15 cases and physical illness or defect a primary cause in 22. Nine children were diagnosed as mentally defective and referred, by arrangement, to the school medical officer.

Sources

The main source from which cases were referred was the school, almost exactly half of the children being sent by headmasters and headmistresses. Parents and relatives sent 34 cases; social agencies such as clubs, welfare workers, and girls' institutions were responsible for about the same number (35). About twenty cases were referred to the clinic by the family doctor, a source that has shown a steady increase as the work of the clinic has become better known. In six instances, the child or young person came himself or herself.

Comments

Such, in summary, are the results of the four years' experience in the Aberdeen clinic. It has suggested some more general reflections.

In the first place, diagnosis has proved, on the whole, easier than treatment. For example, to take the simple instance of educational backwardness, it is usually only a matter of applying an intelligence test and finding that the cause lies in low I. Q. But when it comes to recommending treatment, it becomes obvious that there are no facil-

ities available. It is out of the question for a clinic such as ours to provide extra coaching; and, in any case, the number of backward children in the schools, whether they come under the notice of the clinic or not, is too large to make an "Opportunity Room" in a single center an adequate solution of the problem.

Other problems are even more difficult to treat. Where the home environment is unsatisfactory, something can usually be done by explaining matters to the parents and by asking the social worker to call once or twice. But in other cases, it is not possible to effect any appreciable improvement in those ways. What would be of great assistance is the existence of colonies after the pattern of the late Homer Lane's Little Commonwealth, to which difficult children could, on occasion, be sent for more prolonged re-education. Approved schools meet the needs of children who are actually delinquent or who are suffering from physical maltreatment; but there are cases where the child belongs to what anyone but a psychologist would call a good home and where the child's problem is created by factors in the social relationships difficult to alter so long as the child remains in the family circle. We have ourselves recommended boarding school as a successful solution of the problem; but not every parent is able to meet the cost and not every child is a suitable subject.

Our experience is that the social worker is a most valuable officer, indispensable in fact, and the more time she can give to the work the more valuable are her services. Ideally, she should be a full-time official. She must, naturally, have special qualifications as regards personality, experience, and training. Clinics can play a useful part in providing opportunity for suitable persons to acquire experience and training in social welfare work.

After the prescribing and supplying of appropriate treatment comes the follow-up process, which also falls mainly to the social worker. Only from the information secured in this way can the success or failure of the guidance be estimated, and only time can show whether the problem has been successfully solved.

From the reports of our social worker, it appears that the mere visit to the clinic often has a beneficial effect both on the child and on the parents. The unemotional atmosphere of the interview, the matter-of-fact attitude of the psychologist, the realization that the child's problem is not unique—those all combine to form an attitude therapy, which is in itself of considerable value. Repeated visits may be necessary for similar reasons. A neurotic youth who feels

welcome to attend for a talk every fortnight, may gradually resolve his conflict and lose his inhibitions until time does its work and restores the adjustment that has been lost.

The estimation of final success or failure is difficult. It would be untrue to claim that every child is helped. But there is little doubt that the majority of cases are bettered and many of the problems solved.

It is advisable to draw attention again to one of the obstacles to the successful establishment of child-guidance work. That is the wide-spread notion that the clinic is concerned primarily with mental defectives. We have encountered this prejudice in Aberdeen, as indeed our colleagues have elsewhere. Surprisingly enough, it exists in the minds of some teachers and even physicians, as well as of many parents. Teachers have been found to be reluctant to refer a backward, or merely troublesome, child for interview because they think that the result may be certification and transfer to a special school.

The prejudice is more easily understood on the part of parents; and we have had repeatedly to assure the mothers that, while the duty of certification lay elsewhere, if the child was defective it was in his own interest that he should be sent to a special school. Children themselves readily catch the suggestion that there is a stigma attaching to attendance at the special school and are prone to shout epithets in the street at their less fortunate acquaintances. For these reasons it seems an unfortunate practice to house physical defectives in the same building as mental defectives. Mere administrative convenience should never be held to justify such a policy.

A similar prejudice exists against the clinic owing to the belief that it deals entirely with delinquents. It does, of course, profess to help the delinquent; but it is necessary for the sake of the other patients to avoid giving the impression that *only* delinquents are dealt with.

In the sphere of delinquency, the clinic can perform a very useful service; and in view of the approaching reorganization of the children's courts, it seems worth while considering how the clinic may best serve the interests both of the child and of the law. One thing that will have to be avoided is the impression that the clinic is out to interfere with the magistrates' discretion; otherwise its usefulness may be curtailed. In our practice at Aberdeen, we have found that the sheriff is ready to welcome the clinic's report; but the position may not be the same in the case of lay justices, who may be expected to be more jealous of their authority than the securely placed professional judge.

DYNAMICS OF THE GESTALT PSYCHOLOGY
PART IV

WILLIAM McDOUGALL
Duke University

Having discussed in the three foregoing parts of this article the views on mental dynamics peculiar to Professors Köhler, Koffka and Lewin respectively, I propose in this fourth and final section to examine certain features of the Gestalt doctrine which seem to be held in common by all three of these leaders of the school.

Isomorphism

The principle of isomorphism (ascribed to Wertheimer) seems to be of crucial importance in the schemes of both Köhler and Koffka, and perhaps in that of Lewin also, and requires therefore a few words of comment. It seems to be a new version of the old principle of psycho-physical parallelism, so popular in the later nineteenth century, but now generally regarded as *passé*. The new version assumes the parallelism between psychic events and cerebral events to be more detailed and exact than it was ever supposed to be under the old version. And an essential superiority is claimed for the new version. The old-fashioned parallelist, such as Wundt, thought of the brain-process which parallels conscious thinking as a multitude of separate physical or physico-chemical processes going on in many parts of the brain. But the thinking is a unitary process. Hence Wundt postulated a psychic synthesis that had no parallel among the brain-processes; a unifying synthesis which later writers (translating parallelism into emergent interactionism) have called the *emergence* of a unitary psychic whole from a scattered multitude of brain-events. The new Gestalt version of parallelism, i.e., *isomorphism,* asserts that the brain-processes also form a unitary whole, a physical (or physico-chemical) Gestalt, or a whole with 'segregated wholes' within it; and each such segregated whole is the parallel of a 'thing' in the psychological field. Hence, *if the principle be valid,*

we can deduce properties of the physical *Gestalten* in the brain (the segregated wholes of Köhler) from those of the 'things' of the 'behavioural environment' or of 'the psychological field.' In Köhler's words: "Any actual consciousness is in every case not only blindly coupled to its corresponding psycho-physical process, but is akin to it in essential structural properties."[1]

Thus *isomorphism* allows us to construct a description of the brain-correlates of the psychological field. Koffka writes: "The physiological processes which we construct as the correlates of consciousness are known to us in the first place through their conscious aspect. To treat them as though they were purely physiological, without this conscious aspect, would be to neglect one of their outstanding characteristics. True enough, *this conscious side of the processes does not enter into our causal explanations* [of behaviour] but it has to be recognized as a fact nevertheless. And that leads to the conclusion that *it is the warp and woof* of certain events in nature [certain brain-processes] that they 'reveal themselves,' that they are accompanied by consciousness. Why they are so, and what special characteristics a process must have in order to be so, these are questions that cannot now be answered, and perhaps may never be. But if we accept our conclusion, consciousness can no longer be regarded as a mere epiphenomenon, a mere luxury, which might just as well be absent. For in an aspect which we do not know, these processes would be different, were they not accompanied by consciousness."[2]

And, of course, not only the *things* of the psychological field, but also the forces these things exert upon one another must be mirrored (according to isomorphism) in the brain-process.

It is not necessary to recite the sufficient reasons for repudiation of epiphenomenalism. I have done that at some length in my *Body and Mind;* the postulate has few defenders at the present time; and, besides, Koffka's words cited above seem to imply such repudiation by the G. P's. But I must point out that the implication of his view which he points to as distinguishing it from epiphenomenalism is, in reality, just the implication of epiphenomenalism (as formulated and named by T. H. Huxley) which distinguishes it from pure or strict psycho-physical parallelism. It is the last sentence of the passage last cited which states this essential implication and distinguishing feature of epiphenomenalism. For the essence of epi-

[1] I cite after Koffka.
[2] *Principles of Gestalt Psychology* (New York, 1935), p. 65.

phenomenalism is the assertion that the brain-processes cause, or generate, all features and changes of the field of consciousness. And they can hardly do that without being other than they would be, if they produced no such effects; since every causal process expends energy in producing effects. Huxley's favourite simile was the locomotive engine throwing off waves of sound from its whistle. Just as these vibrations, launched upon the air, have no effect (he said) upon the further movements of the train, so the psychic effects (sensations, feelings, and what not) caused, or generated, by the brain-processes have, he said, no influence upon the further course of the brain-process. Nevertheless, the steam-pressure in the boiler is a little lower for the emission of the sound-vibrations from the whistle; and, in analogous fashion, the brain-processes would, as Koffka says, "be different were they not accompanied by consciousness."

Koffka might perhaps hope to save himself from the reproach of making psychic events mere epiphenomena of the brain-processes, by assuming that what he says of forces in the behavioural field may be taken literally, even though the 'things' of that field are merely epiphenomenal effects of brain-processes. We should then have this curious state of affairs: real forces originating from the pseudo-things of the behavioural field play between those epiphenomenal ghosts, pulling and pushing them about in an epiphenomenal space and otherwise modifying them in a perfectly futile manner. But, even so, the main defect of Huxley's epiphenomenal doctrine would remain. Huxley forgot that, although in a purely mechanical world, the sound of the whistle would exert no effect upon the further progress of the train, in the world as it actually exists and is known to us, a world containing creatures endowed with mentality, with the potentiality of purposive intelligent activity, the sound of the whistling of the engine is not only caused by goal-seeking, or truly purposive, activity, but also may and often does very 'materially' influence the further progress of the train; if only by clearing from its path obstructions which might delay it or even bring its movement to a sudden and disastrous stop. When this truth is brought into the analogy, we see that Huxley should have likened his epiphenomenal consciousness, not to the whistling of the engine, but rather to the creaking of its wheels (a wholly useless functionless purposeless by-product); as Koffka virtually does.

If the passage cited above left room for doubt that Koffka's posi-

tion is epiphenomenalistic, that doubt might be removed by his statements on page 63. There he asserts: "With the tool of a thoroughgoing isomorphism in our hands . . . we must choose a physiological field rather than the behavioural environment as our fundamental category . . . we look ultimately for physiological explanations." That is to say, the explanations both of mental process and of bodily behaviour offered by Gestalt psychology are to be ultimately in terms of cerebral physiology, of the physics and chemistry of the brain.

Koffka's attempt to absolve himself from the charge of epiphenomenalism is entirely ineffective; his *isomorphism* is a stricter version of epiphenomenalism. Whether Köhler's *isomorphism* is the same as Koffka's, or whether it is rather a stricter version of psychophysical parallelism proper, I cannot say. But this question is of little moment, since what I have now to say applies equally to both forms.

First, there lie against *isomorphism* the objections against the parent principle of psycho-physical parallelism, all the objections stated at length in my *Body and Mind*.

Secondly, let it be admitted for *isomorphism* that it may be regarded as a working postulate or hypothesis; and, further, that if it were true it would be very convenient: for then we could make such inferences from one field to the other as the G. P's. so extensively attempt.

But working hypotheses may not be held when they fly in the face of well-established facts, even if merely biological facts.

Thirdly, isomorphism does fly in the face of a wealth of facts. Consider the following instance.

You look with one eye at a large square drawn on the opposite wall, with vertical and horizontal sides. Isomorphism, if valid, requires us to infer that the cerebral excitation correlated with your awareness of the square occupies in the brain a square area of two dimensions (I do not insist on the difficulties raised by the third and the fourth dimensions. The argument is strong enough without them). Now, if you fixate the centre of the square from such a distance that the boundaries of its retinal image fall well outside the foveal area, then we know that the excitation-process in the cerebral hemispheres falls into two halves, one half in the right hemisphere, the other in the left. It is possible that the field of excitation forms, nevertheless, a segregated whole, a Gestalt; for the areas in the two hemispheres are, no doubt, connected by fibres of the *corpus*

callosum; or the Gestalt may directly bridge the vast chasm of the great sulcus, traversing the dense connective tissues of the *dura mater* which fill it. But we can infer with an approach to certainty that the whole excitation does not have the shape of a square. At best it may have the shape of a rectangle, with the longer sides horizontal; but the square does not look wider than deep. Commonly indeed it appears a little deeper than wide. The seamless appearance of the field of view formed through the two hemispheres is, I submit, impossible to reconcile with *isomorphism.*

Consider one other instance. You lie on your back and look up at the centre of an inverted wash-bowl. The bowl-image fills your retinal field and you see it for what it is. Then the wash-bowl is removed and you look up to the zenith of a clear night sky. Again the image of the bowl fills your retina, and the area of cerebral excitation must be very nearly the same as before. But now the spatial meaning is vastly different. You see an immense space with world after world receding to infinite distances.

Many readers of the foregoing objection to the principle will say: "But the G. P's. do not assume a strict similarity or correspondence in shape between the physical area seen and the area of consequent brain-excitation; it is one of their principal theses that there may be and often is a considerable departure from exact correspondence." This is true; but it does not invalidate the criticism. I would ask any reader not convinced by my reasoning to read carefully pages 61 to 63 of Koffka's *Principles.* Let me try to condense their substance so far as relevant to our discussion.

Koffka is here concerned to justify Köhler's bold attempt to construct an account of the cerebral events by inference from 'direct experience,' to "use psychological observation, i.e. observation of the behavioural field and of phenomenal behaviour [all this being observation of the conscious field and its changes—what would commonly be called 'introspective observation'] as material for a physiological theory." He goes on to defend this attempt by asserting that "all observation is observation of behavioural facts of direct experience." He remarks that Köhler has emphasized this 'fact.' Köhler, therefore, as well as Koffka, seems to have committed himself to this very questionable epistemology, namely, that all observation is introspective. But we may for present purposes let that pass unchallenged. Koffka goes on thus—Let B stand for all observed facts of the behavioural world [i.e., all facts of direct experience, of

immediate observation, or of the conscious field] G for the things and processes of the geographical world (or physical environment) and P for the cerebral processes by the mediation of which alone B facts are related to G facts. "Now P," says Koffka, "is in causal connection with G and in *a more direct connection* with B . . . *If B and P are essentially alike,* then it only depends upon the G-P relation when and how we can gain knowledge about G from P. And if it is so, then surely observation of B reveals to us properties of P. . . . Thus, isomorphism, a term implying equality of form, makes the bold assumption that the motion of the atoms and molecules of the brain are [*sic*] not fundamentally different from thoughts and feelings but *in their molar aspects, considered as processes in extension, identical*" (p. 62).

Now I am not arguing against the attempt to attain knowledge of the cerebral processes by inference from 'direct experience.' This attempt, which is Köhler's chief concern, seems to me perfectly legitimate and necessary. It is the passages which I have italicised that are significant for our present discussion. I take them to mean quite indubitably that, in respect of spatial form, the B processes and the corresponding P processes are very closely alike, or 'identical'; while, in this same spatial respect, the relation between the P and the G processes is less close (being merely causal) but yet of a certain regularity and constancy that allows us to infer the spatial qualities and relations in the G world (in virtue of the essential similarity of the facts of the P order to corresponding facts of the B order).[3]

All this can only mean that when you are conscious of a square there must be (according to the principle of *isomorphism*) a square patch of cerebral excitation forming a segregated whole or physical Gestalt within the whole region of more diffuse excitation. Or, if it be said that the terms 'identical,' 'equality,' 'same as,' applied to the psychic and the corresponding cerebral process must not be taken too literally, then at least (if the principle is to have any meaning and is to be used at all in the way in which it is used as justifying deductions from facts of consciousness to the form of cerebral events), there must be some constancy of relation between the shape you are conscious of and the shape of the correlated physical Gestalt in your brain.

[3] Since the precise meaning of isomorphism is here crucial, I cite a brief definition of it from the book by G. W. Hartmann devoted to a critical exposition of G. P. (*Gestalt Psychology,* New York, 1935) as follows: "Isomorphism, i.e. the view that the form of mental events is the same as physical [*sic*]."

This being admitted, go back to the monocular perception of a large square area on the wall before you. At one moment you fixate a point a little to the right of its right-hand border, and you see it as a square. Then you fixate a point at its centre. In both cases you see it as a square. But, in the former case (where the physical image on the wall is in the left half of your visual field), it is projected on to the right half of your retina, and the cerebral Gestalt is confined to your right hemisphere. And, in the second case where the physical image on the wall is about the centre of your field of vision and is projected on both sides of the fovea and beyond the foveal region of the retina) the cerebral Gestalt must extend itself in both cerebral hemispheres, partly in one, partly in the other. It is, then, in the highest degree improbable, if not utterly impossible, that the cerebral Gestalt in the former case is of the same shape as the cerebral Gestalt in the second case. But, since in both cases you are conscious of a square, unless the cerebral Gestalts in the two cases are virtually of the same shape, the principle of *isomorphism* cannot be valid.

The foregoing is only one of many similar objections to *isomorphism* that might be elaborated. Consider one other, namely, the case of distortion of after-images, which has been much discussed. At the centre of a large square wall is a vertical right-angled bluish-green cross. From such a position that your line of vision is perpendicular to the wall, you fixate the cross until you have a red after-image of it. Then you project the cross to each of the corners of the square wall in turn (by turning either your eyes in their sockets, or your head on your shoulders, or your whole body as well—it makes no difference). At each position, at each corner, the red cross undergoes a marked distortion of shape (a different distortion for each of the four corners, a distortion adapting the cross in each case to the perspective effects of the projection of the boundaries of the square on the retina) the arms appearing no longer at right angles to one another; as soon as you close your eyes, or fixate again the central part of the square wall, the two limbs of the after-image resume their rectangular relation, becoming vertical and horizontal respectively.

Now here we have a continuing, practically unchanging area of retinal excitation (the after-effect on the retina—or if the seat of the after-effect be cerebral, the argument is all the stronger) which gives rise to (or is the physiological basis for) the conscious cross; and the conscious cross changes in shape with every position to

which it is projected, in *spite of the unchanging retinal stimulation.* Is it conceivable that these changes of shape of the cross as it appears in consciousness are determined by corresponding changes in shape of a cross-shaped area of cerebral excitation? For that is what *isomorphism* implies. And if the G. P. replies in the affirmative, as he must; then we ask—Is it conceivable that the perspective distortion of the image of the boundaries of the square area and their rectification as spatial meanings (in accordance with much experience of perspective-effects) should bring about in each case just the appropriate change of shape of the cerebral Gestalt of the cross, in spite of the unchanged shape of the retinal excitation?

The facts seem to suggest almost irresistibly that the changes of appearance of the cross (of its spatial meaning), with every change of the position upon which it is projected, is due in each case to an activity of adjustment or interpretation which supervenes upon the cortical process which is the immediate cerebral ground of the cross-shaped patch of colour (the after-image); that the latter (like its retinal basis) continues substantially without change; while the interpretation process varies with the background upon which the cross is projected. That the lines seen upon the background play an essential rôle in bringing about this adjustment or interpretation is made clear by the fact that, if the background has no such perspective lines (e.g., if the projection is made on to the night sky or the field of the closed eyes) no distortion of the after-image occurs.[4]

Treatment of Purposive Activity in Gestalt Psychology

All the G. P's. recognize the purposive character of our behaviour and of much of our mental activity. And all of them deny that their interpretation of behaviour is mechanistic.[5] Yet they do not aim at teleological interpretation of behaviour and of mental activity. Their attitude towards this most fundamental question is ambiguous. And each is ambiguous in his own peculiar manner. For the meaning they attach to the word 'mechanistic' is peculiar. They do not

[4] I have used facts of this order (in my *Body and Mind*) as part of the basis of an argument that meanings have no immediate cerebral correlates. But that conclusion is not a necessary part of the present argument. I am concerned only to argue that, if the distorted appearance of the cross has an immediate physical basis of any sort in some cerebral process, that process is distinct from and supervenient to the cerebral process which is the immediate correlate of the patch of colour. In other words, we have here a case which requires the psychic-stimulus theory of space-perception (see my *Outline of Psychology*).

[5] This is certainly true of Köhler and of Koffka. Lewin's position is more ambiguous.

recognize a clear-cut dichotomy between mechanistic and teleological processes.[6] Köhler, when he repudiates mechanistic interpretation, means only to repudiate the machine-theory of behaviour, the theory of strictly mechanical causation by a sequence of processes like those of a machine in which the fixed relations of each part (each wheel, cog, lever, etc.) permit it to function only in one manner precisely determined by those relations. His aim and ideal is to explain all behaviour in terms of physics and chemistry, not the physics and chemistry of the nineteenth century, but a physico-chemical science reformed by the introduction into physics of the Gestalt principle. Since all goal-seeking and all seemingly teleological activity is thus to be explained away in terms of non-teleological processes as conceived by a reformed physics, Köhler's psychology cannot be exempted from the charge of being mechanistic,[7] unless the dichotomy of mechanistic or teleological be denied (see footnote 6). At least it seems clear that he repudiates teleological or purposive causation as a fundamental category of explanation.

Koffka skillfully avoids this issue. He, like Köhler and so many other moderns, professes to repudiate both mechanism and vitalism, and to have found a third way, a *via media* superior to both. But the manner in which he does this is peculiar to himself. He begins by drawing a distinction between vitalism, on the one hand, and, on the other hand, what he calls materialism or positivism—what is better called the mechanistic theory (see my *Modern Materialism,* where it is shown that the mechanistic or a-teleological theory is the modern successor to old-fashioned materialism).

He professes to find the essential distinction between these two theories to be that materialism or positivism recognized no *order* in the world, while vitalism recognized *order* as pervading at least the

[6] I have insisted elsewhere (see my *Modern Materialism and Emergent Evolution,* London 1928, especially Note I *On the Meaning of 'Mechanistic'*) that as soon as we give up the old billiard-ball conception of physical causation, we have no other possible way of defining mechanistic causation than the negative one, namely, causation which is not teleological, or causation in which purposive activity plays no part. If this be true, and I see no escape from it, the dichotomy between the mechanistic and the teleological remains in principle clear cut, and every instance of causation must be, and must be interpreted as, either one or the other (or, if complex, of mixed type); there is no room for causation which, like that of the G. P's, is neither one nor the other.

[7] L. von Bertalanffy, discussing this problem in relation to various theories, including those of Köhler and of R. Goldschmidt, remarks of the latter that his "theory of genetics is strictly mechanistic, but is not a machine theory" (*Modern Theories of Development,* Oxford, 1923). It is clear that he would apply the same verdict to Köhler's system and that he rejects Köhler's use of 'mechanistic' as synonymous with 'machine-theory'.

organic realm and was characterized by the postulation of a special agency or vital force to account for such *order*. His own position he would define by saying: "We accept order but we reject a special factor that produces it . . . we must attempt to reconcile our acceptance and our rejection, we must develop a category of order which is free of vitalism. The concept of order in its modern form is derived from the observation of living beings. But that does not mean that its application is restricted to life. Should it be possible to demonstrate order as a characteristic of *natural* events and *therefore within the domain of physics,* then we could accept it in the science of life without introducing a special vital force responsible for the creation of order. And that is exactly the solution which Gestalt theory has offered and tried to elaborate" (p. 17).

Let me say at once that this alleged lack of order in the materialist's world, or alleged lack of any explanation of it by mechanistic physics, seems to be very ill-chosen as its distinguishing mark. Order, repetition, regularity, and absolute lawfulness are just the features of the physical world which Newtonian or Galileian physics can best deal with. Is there no order in the swinging pendulum, the vibrating string, the sound waves, the ripples running over the smooth water in perfect circles, the absolute speed of light, and all the beautifully and exactly explained phenomena of refraction, etc., etc.?

But Koffka, when he speaks of order, seems to have very vaguely in mind order as the product and evidence of purposeful ordering. For he writes: "if life is as blind as inorganic nature we must have as little respect for the one as for the other" (p. 17). But, if this is what he means, then it is order as evidence of purpose that he has in view; and he should say so plainly.[8]

However, order is for Koffka only one of several features of living beings which vitalism sought to account for and which are now to be accounted for by G. P. Significance, meaning, and value also are absent from the purely materialist or positivist world. "A psychology which has no place for the concepts of meaning and value cannot be a complete psychology. At best it can give a sort of understructure, treating of the animal side of man, on which the main building, harbouring his cultural side, must be erected . . . far from being compelled to banish concepts like meaning and value

[8] That Koffka accepts order as evidence of purpose seems to be implied also in the following: "Yet behaviour is not haphazard, but purposive, goal-directed, i.e. orderly and meaningful" (*op. cit.*, p. 311).

from psychology and science in general, we must use these concepts for a full understanding of the mind and the world, which is at the same time a full explanation" (pp. 19-21).

Here again Koffka misses the essential point, namely, that 'significance' and 'value' are meaningless terms in any system that does not fully recognize the purposive nature of all our activities and the teleological causation of our behaviour, or that, in other words, our behaviour expresses striving towards goals.

When, then, Koffka follows Köhler in asserting that all explanation of behaviour and mental process must be in physical terms,[9] he is repudiating all his fine words about order, significance, meaning and value, unless he can show that modern physics (reformed by the introduction of Gestalt principles) conceives and explains the events it deals with in terms of teleological activities rather than mechanistic (i.e., non-purposive) causation; and this neither he nor Köhler suggests or attempts. For neither of them follows Whitehead and J. S. Haldane (who, equally with the G. P's., repudiate vitalism) in attempting to assimilate the physical realm to the organic, and to mentally active beings, to show that the physical realm is not (as physics and nearly all physicists always have taught and still do teach) a realm of blind causal sequences, in which teleological activity has no place and rôle. Rather, like the mechanists and the materialists whom they profess to repudiate, they assimilate the organic to the mindless inorganic, and claim to have *somehow* remedied all the inadequacies of such a world-view by the recognition of the principle of Gestalt as pervading the physical realm as well as the organic.[10]

[9] "I admit that in our *ultimate* explanations we can have but *one* universe of discourse and that it must be the one about which physics has taught us so much. Not only is the energy which is consumed in our behaviour of chemical origin, the forces which are responsible for each individual motion must be considered as physico-chemical forces also. The organism is a physico-chemical system by itself . . . and its actions must be *ultimately* explained in terms of processes within this system. If an action is reducible to a causal sequence of organic processes, it becomes intelligible because it is then reduced to one universe of discourse which is the same as that in which its actual movements take place" (italics are Koffka's, p. 48).

[10] See my article, "The Philosophy of a Biologist," *Philosophy*, 1936, in which J. S. Haldane's spiritual realism as a basis for non-mechanistic biology is critically examined. Of Galileo's influence Haldane wrote: "The world is just beginning to realize that when Galileo and the early physicists introduced the principles of physical investigation they were not merely launching a new discovery, but also unconsciously shutting out other avenues of discovery. Since Galileo's time biology has been continuously confused by vain efforts to twist physiological and morphological observation into a form consistent with the Galilean postulates; and

One most significant feature of the publications of both Köhler and Koffka is their avoidance of the facts of foresight, so essential for all understanding of purposive activity, and therefore of all behaviour other than such low forms of uncertain status as reflex actions.[11] Not only do they make no attempt to explain the facts and the function of foresight (for such explanation is clearly impossible in the physical terms of Köhler's system of explanation); but also they carefully avoid all mention or explicit recognition of the facts of foresight, and thus evade the obligation to attempt to deal with them on Gestalt principles.

Köhler's rejection of mechanism is rightly characterized by von Bertalanffy[12] as consisting merely in the rejection of the *additive* point of view in science in general, and in the recognition of the facts of organized wholes in both the physical and the biological realms. But that he has succeeded in explaining the wholeness of the organism cannot be admitted. The fact of wholeness may be and is properly used as a guiding principle in both biological and psychological research; although we are very far from any understanding or explanation of such wholeness.[13] If, then, as Bertalanffy says, the Gestalt principles are still quite unable to explain the simpler forms of biological wholeness, is it not a mistake to hold up psychology pending the success of the attempt to explain by their aid the most recondite psychological facts of purposive striving, facts infinitely more remote from 'solution' by Gestalt theory than the still unsolved elementary problems of embryology and morphology?

Köhler recognizes 'directed attitudes'; and Koffka (more grudgingly and shyly) recognizes 'events definitely directed' (p. 382), speaks of controlled activities directed to goals (p. 584), and makes

psychology has been similarly confused through vain efforts to relate a Galilean body and environment to a soul or mind."

[11] The avoidance continues in spite of the challenge which I threw out to them in my article ("Insight and Foresight in Various Animals," *Journal of Comparative Psychology*, 1931, XI); a challenge to recognize the wealth of facts implying foresight and to deal with them on Gestalt principles if possible.

[12] *Modern Theories of Development* (Oxford, 1933).

[13] On this Bertalanffy writes the following sound reflection: "The Gestalt Theory has the great merit of recognizing that an organization of processes is possible not only on the basis of fixed structural conditions; but may also result from dynamic interactions within the total system . . . it is, however, not to be forgotten that the organic 'configuration' has essential features which are quite different from the inorganic ones hitherto known. We have formulated as such the 'rise of the level of organization by causes immanent to the system,' and the 'historical character of the germ'. For these features we have no analogue in inorganic systems, and they do not seem to be explained merely by an application of 'Gestalt Laws' found in the inorganic realm" (*ibid.*, p. 108).

much of 'needs' whose 'tensions' are identified with 'aims' (p. 330); and in other such somewhat vague terms recognizes the essential facts of goal-directed impulses and strivings.

Let them, then, throw overboard all their shilly-shally hedging, and frankly accept the facts of goal-seeking activity and construct their psychology on that purposive basis.

In a long and admittedly unsuccessful attempt to explain in physical terms the various selective influences upon the course of associative reproduction, Koffka recognizes the great selective power of 'attitudes' (here using the word much as Köhler does). Incidentally he remarks: "We could easily fall into the trap of a teleological explanation, looking at the *result* of communication and using this result as a cause of the process" (p. 599). Here Koffka reveals the root of his trouble, of all his ambiguity, his playing hot and cold on the goal-seeking facts and their purposive interpretation. Namely, he still entertains that utterly erroneous conception of teleological explanation which consists in regarding the advantageous effect of an action as the cause of that action. We can only beg him to strive earnestly toward the goal of a better understanding of the nature of teleological or goal-seeking activity.

Lewin's Treatment of Purposive Activity

Lewin's evasion of the facts of goal-seeking and of purposive activity in general is somewhat different. Its keynote is a misunderstanding of the nature of the problem. First, it is clear that Lewin (like Köhler and Koffka) although the words 'goal,' 'aim,' 'purpose,' 'wish,' 'intention,' 'desire,' 'will,' 'volition,' occur in his pages, does not mean to recognize the purposive or goal-seeking activity as something distinct from being pushed and pulled to and fro in mechanical fashion. For he aims at explaining away what he describes as instances "which make an especially goal-striving impression" (p. 81), or make "a pronounced goal-seeking impression" (p. 120).

The principal step in his process of belittling to a vanishing point the differences between mechanistic and teleological processes is made in the opening essay, that on Aristotle and Galileo. It consists in asserting that direction towards a goal is the mark of a teleological event, but that physical forces are now recognized as being 'directed quantities.' Hence the difference between mech-

anistic and teleological events (and explanation) disappears.[14] That is to say, the fall of a stone to the ground is teleological, because it is directed toward the centre of the earth; and the motion of the sun and solar system is teleological because it is directed toward some distant star. What small power to mislead the statement may have it owes to an ambiguity, a double meaning, of the word 'directed.' It is not necessary to repeat here the list of the objective marks of teleological or purposive behaviour.[15]

An allied and equally simple misunderstanding is revealed in the same essay when Lewin proceeds to discuss and renounce instincts. Dynamic explanation in psychology has been, he writes, "notably retarded" by the "traditional mistake of regarding causal explanation as an explanation without the use of directed forces." The implication is that those wholly mythical persons who regarded mechanical forces as having no direction (as pushing or pulling in general but not towards any particular point of the compass) on observing that a hungry animal moves towards its food, or that a bird flies toward its nest or toward its distant breeding ground a thousand miles away, were compelled to abjure mechanical explanation of such facts of directed movement because they believed that mechanical forces are directionless; and therefore they fell back on the Aristotelian or anthropomorphic theory of instincts. Further, it is implied that Lewin's introduction of vectors into psychology has made 'instinct' quite otiose; because vectors are 'directed quantities.'

A further error is made by Lewin in asserting that those who postulate instincts assume that instinctive impulses operate independently of the environment, or of "the concrete whole situation" (p. 39).[16] It may be that among the vast number of authors who have discussed instinct (including as it does very many who have no slightest claim to be regarded as men of science) there have been a

[14] Since the simplicity of this assertion is almost incredible, it is necessary to cite in full the chief passage concerned: "It is customary to say that teleology assumes a direction of events toward a goal, which causal explanation does not recognize, and to see in this the most essential difference between teleological and causal explanation. But this sort of view is inadequate, for the causal explanation of modern physics uses directed quantities, mathematically described vectors. Physical force, which is defined as 'the cause of a physical change,' is considered a directed, vectorial factor. In the employment of vectorial factors as the foundation of dynamics there is thus no difference between the modern and the Aristotelian view" (p. 28).

[15] They are stated and discussed at some length in my *Outline of Psychology*.

[16] Again: "The heredity or environment discussion also shows, even in its particulars, how completely these concepts separate object [by 'object' is here meant 'organism'] and situation and derive the dynamics from the isolated object itself."

few (theologians perhaps or purely popular authors) who have made this kind of assumption; but an outstanding feature of the scientific discussion of instinctive behaviour is that it has been very largely concerned precisely with the problem of finding what perceptual activities and what environmental things and processes are concerned in the guidance of instinctive activities (see the literature of bird-migration and of 'homing' in general).[17]

It is clear that Lewin offers his formula of valences and vectors as a substitute for instinct of every kind, a substitute which completely solves all the riddles of instinctive action (as well as of all human action) by offering in every case the easy solution of a vector, a vector which gives a quasi-mechanical explanation of every movement.

But Lewin cannot do without his 'needs.' Without them he would make no advance upon pure connectionism, upon Watson, Thorndike, and Pavlov. Yet nowhere does he attempt the slightest enquiry into these all-important dynamic factors, the essential bases of all his quasi-dynamic quasi-explanations; he merely endows his creatures with a need corresponding to every observed action and ascribes to this vague something, the need, (this otherwise quite empty word) the magic power of endowing objects with valences, which in turn is nothing more than a magic power of sending out vectors to operate magically, yet mechanically, upon the possessor of the need.

Whether Lewin recognizes that certain 'needs' are part of the racial endowment of every species and, in so far as they are dynamic

[17] As an example of the perversity of Lewin's way of thinking, the following passage is notable: "The instincts are the sum of those vectors conditioned by predispositions which it is thought must be ascribed to an individual. The instincts are determined essentially by finding out what actions occur most frequently or regularly in the *actual life* of the individual or of a group of like individuals. That which is *common* to these frequent acts (e.g., food getting, fighting, mutual aid) is regarded as the *essence* or essential nature of the processes. Again, completely in the Aristotelian sense, these abstract class concepts are set up as at once the goal and the cause of the process. . . . For the aim that still completely dominates the procedure of psychology in large fields is founded upon its effort to free itself of the connection to specific situations." Anyone conversant with the facts and theories of instinctive action knows that (in direct contradiction of Lewin's assertion) very many of the most striking instances of instinctive action (and these more than any others have drawn attention to instinct, and have moulded the definitions and the theories of instinct) are actions performed by a creature only once in its lifetime (the mating of myriads of insects) or at most only a very few times (the nest-building and the migrating of birds, the swarming of bees); and in some such instances the action is performed only once in its lifetime by one out of hundreds or thousands of its fellows of the same sex and species (e.g., the nuptial flight and mating of the honey bee).

factors and 'reservoirs of energy,' are identical with what are commonly called instincts, I cannot discover. I cite therefore in a footnote the statements on this head of a psychologist who has devoted a volume to an impartial and critical exposition of the teaching of the Gestalt school.[18]

When, then, Lewin writes occasionally that "a natural teleology reigns" (p. 120) or of "the natural teleology characteristic of the interest situation" (p. 155), we must not be misled into supposing that he recognizes any essential difference between mechanistic and teleological events. Like Köhler and Koffka, he carefully avoids all discussion of the rôle of foresight; or rather, when he touches upon, or near to it, he promptly shies away or offers some quasi-mechanical pseudo explanation. Thus, when he touches on one of the most typical and simple instances of foresighted purposive action, that of the burnt child shunning the fire, he writes: "The reason that the burned child shuns the fire . . . is not to be sought merely in an associative coupling with pain. More essential is an increase in the degree of reality of the punishment." And in general: "The degree of reality of reward or punishment plays a large rôle in determining the actual behaviour of the child. . . . Above all it is a function of the certainty with which the child anticipates punishment or reward" (p. 161). Here we have some recognition of the fact that foreseeing or anticipation plays a rôle of vast importance. But when Lewin comes to explain the influence of reward and punishment in any concrete instance, it is again the same old story, the universal formula: the reward and the punishment (no matter how far away in the future they may be) send out their vectors which attract or repell the child. One may ask whether Galilean physics recognizes forces or vectors which spring from objects that do not yet exist and,

[18] In *Gestalt Psychology* (New York, 1935) Dr. G. W. Hartmann writes in a chapter devoted to Lewin's views: "Lewin's position is different from McDougall's on this point. Instead of championing the reality of a limited number of inner 'drives,' he merely holds that the organism has definite possibilities of reacting when certain conditions are present." Which is as much as to say that Lewin has the merit of cautiously preserving an extreme vagueness and ambiguity on this fundamental question. Hartmann writes further: "Gestalt theory could be much clearer on the subject of instinct than it is. [He might fairly have said that it could not be vaguer or more deliberately non-committal.] It rejects flatly McDougall's classification of instincts [I have always avoided and deprecated all attempts to classify instincts] and yet acknowledges the reality of native urges. If by instinct we mean the systems which the organism has at birth, configurationism certainly has a place for them, because the organism at any time is made up of physiological systems that are responsible for its conduct: these systems are functions of what they were at birth or as a consequence of maturation, and of the changes that may have been produced in them by use."

spanning the time interval between a remote future and the present moment, operate now upon some existing entity.

Some Physical Dynamic Principles Are Vaguely Suggested

Scattered throughout the Gestalt writings occur a variety of physical principles that are suggested as capable of accounting for all seemingly goal-seeking activities. None of them is followed up whole-heartedly as though the suggestion were meant to be taken seriously; nor is it clear in how far the variously designated principles are identical with one another. The second law of thermodynamics, the principle of 'closure,' the principle of return to equilibrium, the law of Prägnanz, of good shape; of all these it seems to be suggested that they are physical principles (i.e., are manifested in the inorganic realm) and will explain goal-seeking activity. Of all these, the return-to-equilibrium seems to be offered most seriously, especially by Koffka; and I cite his reference to it, if only to make clear that for Koffka, as for Köhler, all purposive activity is to be explained away in mechanistic (though not machine-theory) terms.

Claiming (with what degree of justification we have already seen) to have explained in physical terms "order and meaning" in the field of perception, Koffka turns "to achieve the same end in the field of behaviour" and begins by citing from G. Humphrey as follows: "The organism may be said to behave as an intricate system of material processes, tending actively to maintain a complex pattern under constantly changing conditions." "This proposition, amply developed by its author," writes Koffka, "gives us such a first principle. It claims that the organism is a peculiar kind of system, a kind, however, which may also be found in the inorganic world, and which is so constituted that all its reactions have a conservative tendency." The reader is led to suppose that, by aid of this principle, Koffka is about to explain away all seemingly goal-seeking behaviour.[19] But no. In spite of repeated laudatory references to this principle, Koffka actually makes for it only the very modest claim that it 'starts us on the right road' and 'leaves a place for all that is most distinctive about human behaviour' (p. 310). For, although he suggests that it is adequate to explain all animal behaviour, he is

[19] This principle, under the name of 'complacency,' has been given this distinguished office by R. C. Raup in a book of that name. The claim of this physical principle as all sufficient for the explanation of all human activities is examined at some length in my *Modern Materialism* (pp. 196-206).

sufficiently frank and clear-sighted to admit, when he turns to human achievement, "that it cannot be sufficient is obvious" (p. 309). But even the modest claim made for the principle by Koffka is very disputable. It is, I suggest, clear that the principle, if it is true of organisms in general, leaves no room for the achievement of novelties, for successful struggling against the stream, for self-conscious development, for all the creative activities that are the most distinctively human of all forms of behaviour. And since, by Koffka's own admission, it will not explain the distinctively human activities, why push it forward, with the air of having found an all sufficient mechanistic principle for the explaining away of the seemingly teleological? The instance suffices to illustrate what I mean in saying that these various attempts are half-hearted suggestions that are never pushed home by the Gestalt psychologists.

TRENDS IN THE STUDY OF PERSONALITY

(AS REVEALED IN THE 1936 MEETING OF THE AMERICAN PSYCHOLOGICAL ASSOCIATION)

HENRY SEBASTIAN ODBERT

Dartmouth College

The student of personality finds a rapidly increasing amount of pertinent material in the annual meetings of the American Psychological Association. The program of the 1936 meeting, held at Dartmouth College in Hanover, New Hampshire, early in September, offered more than fifty papers bearing on some aspect of this widely spreading field. Papers in the session on personality were supplemented by others in sessions on psychometrics and learning and on the fields of vocational, abnormal, child, social, political, educational, and even animal psychology.

A survey of this material should indicate some main trends in the study of personality in America. The present paper attempts such a survey, the first part comparing the increasing attention to factor analysis with attempts to approach more directly the problem of the individual, the second part indicating progress in developing statistical techniques, in seeking general patterns of behavior or opinion, in applying testing programs, and in studying factors in personality development.[1]

The trend toward a more widespread use of factor analysis has been apparent for the past few years. The various methods are becoming accepted tools for studying a wide range of problems, and a considerable body of data is being built up even while the methods themselves are being further refined.

In the 1936 meeting two papers gave results of studies using L. L. Thurstone's methods of analysis in the field of personality. Thurstone himself reported that fifty-six psychological tests admin-

[1] The paper of necessity and by intention represents a particular point of view. It would be impossible to present all material with equal emphasis, and in any event a bare abstract of material would be only a poor reproduction of abstracts elsewhere available (in the *Psychol. Bull.*, 1936). It is recognized, however, that this selection may slight some papers which future developments will stress.

istered to 240 students yielded seven uncorrelated primary abilities. These he named visual imagery, perceptual speed, memory, word fluency, number facility, induction, and verbal relations. He stated in discussion that despite his general feeling that correlated abilities might most nearly represent psychological realities, he had often found that the more extensive and varied the data, the more closely they were described by uncorrelated factors. While the present data might be slightly better described by correlated factors, all such correlations actually proved to be quite low.

Charles M. Harsh reduced thirteen categories of annoyances to five dimensions, tentatively identified as annoyance at four sorts of situations (appearance of others, violations of morals or mores, suggestions of superiority in others, and unintentionally disagreeable acts), and a fifth sort of annoyance described as a combination of physiological and acquired sensitivity. He viewed these factors as "empirically interrelated types of annoying situation," stating that genetic and social influences might be combined in any single factor, and that their interpretation as basic underlying elements is unessential to the method. He also used Thurstone's methods in following W. Stephenson's suggestion of inverted factor analysis to find groups of persons showing similar patterns, but lack of stability in the figures made interpretation difficult.

The theory of factor analysis received elaboration in two further papers. Paul Horst presented a somewhat new method of deriving independent factor scores from correlated test scores, and Harold Gulliksen developed a theorem describing the relationship between the multiple correlation coefficient of a test and its communality (that part of its variance due to common factors).

There were no direct objections to factor analysis, although papers of Henry Link, Joseph Zubin, and F. H. Allport showed some dissatisfaction, at least with its scope. Link stated that according to his conception of personality there could be no question of independence of traits, a criterion regarded as desirable by Kelley, Hotelling, and many other proponents of factor analysis. Zubin felt that factor analysis gets too far from the individual, and presented a technique for "pattern analysis," by which the group tested may be divided into types or sub-groups of individuals who give the same pattern of answers to a group of items.

F. H. Allport's provocative paper constituted a more general objection to the whole trait approach as usually conceived. He pro-

posed a more direct and intensive study of the individual, arguing that a trait approach is inadequate to reveal the full consistency of the individual, "for behavior which exhibits traits is not only measurable, but is individualized, dynamic, and peculiar to the individual concerned. The same acts which express the degree of a trait, as represented upon a societal trait-continuum, may also be arranged upon a purely intra-individual, 'telic' continuum according to the degree in which they fulfill something which the individual himself is trying to do."

Allport feels that every act represents not one, but a number of things the individual is trying to do, and thus has something of the character of the entire individual. He believes that while this sort of integration does not lend itself to the usual statistical comparison of individuals, it can nevertheless be perceived by trained observers and made a basis for prediction. Studies along these lines may yield the laws of the individual which are needed for a scientific treatment of personality.

Unfortunately there was not time for more than a very sketchy indication of just how these principles are being applied experimentally. Nor was it clear that Allport's objections to a trait approach apply to all the current views of the term "trait." Despite his assertion that he is not seeking some sort of "super-trait," some will still argue that what a person is "trying to do" fits very well a definition of a trait as a personalized general determining tendency. However, these matters may be clarified in a more complete presentation, which will be awaited with great interest.

Certain other papers placed the emphasis, though less squarely, on the individual. Stella Whiteside's paper was perhaps the most closely allied in spirit to Allport's. She reported finding, by a case study method, definite and widely integrated life foci of forty women in their statements about themselves and others. These foci appeared in such varied spheres as diet, religious belief, cultural activities, economic comfort, and vocation.

Two other papers were concerned with helping the individual vocationally. W. V. Bingham argued that when a preponderance of an individual's scores in a battery of tests points in one direction, that fact may be significant, even though none of the separate scores is significantly extreme. At the same time he questioned the significance of extreme scores when we do not know the range of the standardizing group. E. E. Edelman and W. A. Lurie indicated the

need of individual analysis, while emphasizing its difficulties with our present insecure knowledge of basic abilities and traits.

In a large majority of papers, however, the individual received little or no attention. Only once in the whole meeting was a concrete individual made a central object of discussion—and this was in a session not on personality but on learning, when P. C. Young described a case of transfer of training (a problem closely related to personality, as G. W. Allport has shown). While we have reviewed four papers concerned with factor analysis and five with a more individual approach, two of these latter papers appeared to be largely in the correlational tradition, which points to factor analysis as a logical extension. The same is true of a majority of the papers still to be mentioned, so that direct studies of the individual were actually quite in the minority.[2]

This emphasis suggests various interpretations which cannot be entered into here. For instance, it might possibly reflect a feeling that detailed individual consideration can profitably proceed only when descriptive categories are more securely fixed. Or again it may reflect a historical development, showing how fundamentally our views of personality have been affected by the statistical approaches of educational and vocational psychology. In any event, factor analysis has certainly given a new focus to the interests of many workers who were finding previous methods inadequate to the complexity of their problems. It provides, more than previous correlational approaches, a means of dealing at one time with a multiplicity of influences, and yet it keeps such multiplicity to a minimum. In this compromise may lie its strength.

On the other hand, not all workers can adopt the method, or seem inclined to. It will be interesting to observe whether Allport's proposal, or some other direct approach to the individual, will give a new focus to the work of those who are unable to solve their problems by factor analysis, and at the same time are unhappy with present methods of studying the individual. It will be interesting, too, to see whether such an approach avoids the danger indicated by Gardner Murphy as the "organism error," the danger of viewing personality as residing wholly within the individual, without recognizing its dependence on concrete social situations. The discussion aroused by Murphy's restatement of this problem in the stimulating

[2] It is recognized, of course, that factor analysis leads to the assigning of scores to the individual, which place him in a multi-dimensional space. But consideration of such individuals is not a conspicuous part of the discussions of factor analysis.

round table on social psychology indicated that the problem is vital, and as yet unsolved.

There remain a variety of contributions difficult to classify, yet somehow suggestive for the student of personality. Brief, uncritical descriptions will indicate the range and direction of interests, though they must inevitably distort the content of particular papers, and may often give an unwarranted air of finality.

Of the papers largely concerned with technique, we may mention a detailed analysis of test items by R. S. Uhrbrock, the presentation of some new and simpler formulas for multiple regression by H. D. Griffin, a formula for determining the best single set of weights to use in simultaneously predicting several criteria, by A. K. Kurtz, a discussion of reasons for the observed greater variability of higher I.Q.s, by Q. McNemar, and a discussion of rank-difference and unlike-sign correlations by E. E. Cureton. I. Lorge pointed out that acceptance of an opinion showed greater stability than rejection, a fact which should be considered in determining weights for items, and which should be significant as well for a general theory of attitudes.

Still other papers suggest general patterns of behavior or opinion. C. R. Atwell showed that errors in the Army Alpha, usually obscured in the total score, might be used to detect a "caution" factor. Link, on the basis of extensive testing, item-analysis, and retesting, has developed a test for five traits: adjustment to the opposite sex, social ascendancy or submissiveness, self-determination, economic self-determination, and extroversion-introversion. L. F. Beck found that several tests of waking suggestibility enable one to predict the depth of hypnosis with considerable accuracy. Barbara Burke reported that children's criticisms revealed generalized positive and negative social sentiments. Vernon Jones found liberalism and conservatism to be far from unitary characteristics, although some minor constellations appeared, while T. F. Lentz, on the other hand, found markedly generalized radicalism overlapping so much with international-mindedness as to suggest a general "humanitarian" factor. Thus the generality-specificity problem continues. Ross Stagner, using a cross-out technique, found some general patterns of political and economic stereotypes. We may also mention that M. P. Crawford found consistent behavior in his co-operative chimpanzees when they were paired with various mates.

Other papers reported results of testing programs. R. W. Husband indicated considerable success in predicting law school accom-

plishment by a multiple-correlation technique. Z. Piotrowski found the Rorschach test useful in distinguishing between organic and inorganic psychoses. Edelman and Lurie showed advantages of task samples for vocational prediction. M. Meenes reported ways in which Negro students in a segregated college deviated from white norms of the Bernreuter Personality Inventory.

Finally, several papers hinted at important factors in the development of the mature personality. M. L. Page reported modifying submissive and ascendant behavior in children by manipulating situations to give children some obvious and extended superiority or inferiority, a modification which she felt extended to other situations. Another possible cumulative effect in personality development is suggested by the work of Robert R. Sears, who reported that initial failure interfered with subsequent learning. A minimum of social stimulation during the first thirteen months was found sufficient by Wayne Dennis to allow normal infant development in such responses as laughter, timidity, and vocal greeting. He feels that these activities are not instinctive, "but develop through the child's own activity with only the very minimum of stimulation from adults." In quite a different line Boas, Efron, and Foley found social stimulation an important determinant of gesturing, which superficially appears quite "natural" and unlearned. Motion pictures made possible the analysis of complicated gestural patterns, revealing characteristic differences in the gestures of racially pure Jewish and Italian groups, which disappear in people raised in mixed groups.

Thus, in brief, do we find the study of personality represented at the 1936 meeting of the American Psychological Association. The range of topics considered at the meeting, as well as the large attendance at the session on personality, bear witness to the vigorous interest in the field. Information is being accumulated on a variety of topics, treated by a variety of techniques. The stress on factor analysis in the present paper should not obscure this variety. Objections were heard, as usual, that many speakers were concerned more with technique than with the wider significance of their problems. At times, however, this impression seemed due mainly to the necessary compression of the reports. Though the proportion of papers in which problems and methods are accepted uncritically was still large, it seemed a shade smaller than at times in the past. Evaluations of the present are obviously subject to grave error. But if this evaluation is at all true, the trend it indicates is probably more significant than any other trend here reported.

SOME CONTRIBUTIONS TO THE STUDY OF PERSONALITY

(FROM THE BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE)

LL. WYNN JONES
University of Leeds

The British Association met this year at Blackpool, September 9-16. The President, Sir Joshua Stamp, at the inaugural meeting, thus concluded his address on "The Impact of Science on Society": "We have spent much and long upon the science of matter, and the greater our success the greater must be our failure unless we turn also at long last to an equal advance in the science of man." This year, for the first time, those communications which had an immediate bearing on the life of the community were specially indicated in the program. In Section J (Psychology) the presidential address by Mr. A. W. Wolters on "Patterns of Experience" had obvious relations to the study of character and personality. The view was held that the individual organizes the presented material of experience into manageable patterns in order to obtain control over his environment, and to this end develops skills in his activities. A full report of it appears in *The Advancement of Science,* 1936, and in *The Annual Report.*

Dr. Bond, F.R.C.S., of Leicester, made a brief announcement on the aims of the newly instituted Bureau of Human Heredity. Reports were also presented to the section by three of its committees: 1. The Committee on Perseveration presented a definite program of research into the various processes, phenomena, or effects which could conceivably be regarded as forms of perseveration, or which at least had been studied in the past by different investigators in this field. 2. The Committee on Social Psychology selected as in pressing need for solution: (a) problems involving, and dependent upon, the distribution in the community of sensory, motor, and intellectual capacities; (b) problems of temperament and character, involving the exploration of the possibility of developing satisfactory tests for

temperament and character traits; (c) problems involved in the study of the factors and influences determining failure on the part of individuals to adjust themselves satisfactorily to the conditions of social life, and the extent to which maladjustment is due to psychical characteristics or to environmental causes; and (d) problems lying between psychology and sociology on the one hand, and psychology and anthropology on the other. 3. The Committee on Vocational Tests gave a résumé of the work carried out during previous years. It was found that assembling work divides broadly into (a) "mechanical" assembling work, and (b) "routine" assembling work; and that "mechanical" assembling work involves a mechanical group factor (which was demonstrated to be the same as that discovered by Dr. Cox in his earlier work on mechanical aptitude tests) together with specific manual factors, whereas in "routine" assembling work the mechanical factor is replaced by a manual group factor of fairly wide range. The further development of manual tests and of mechanical tests and the establishment of norms of performance are discussed in the report.

Another paper was that of Professor F. A. E. Crew entitled "A Repetition and Re-examination of McDougall's Lamarckian Experiment." Unlike McDougall, he found no difference between the average number of errors of the experimental and control rats. He also found by analyzing the pedigrees that genetic factors were heavily concerned in the establishment of the scores, a "quick" strain being developed as the result of consistent favorable selection. Next came the paper of Mr. C. Fox on mental heredity, and this was followed by Dr. W. Brown's paper on freedom and moral obligation in the light of modern psychology. Both raised wide issues which are beyond the scope of the present abstract. Dr. Stephenson then read a paper on type psychology and elaborated the technique which has been described in recent issues of this journal. He distinguished between four systems which can be employed in factor analysis. In the first, tests, traits, measurements or attributes are regarded as variables and persons as population. In the second, persons are the variables for a population of attributes. The third considers persons as variables, but the attributes have first been reduced so that all are given equal weight; e.g., we regard a large number of body-measurements such as height, arm-length, neck-circumference, nose-length, etc. in such a way that a nose of standard length has the same weight as an arm of standard length. In the fourth system attributes are

variables, but each attribute (or body-measurement in this example) is judged with respect to the individual of which it is part. The psychological applications of these systems to the study of individual differences in type were discussed.

There was a discussion on the psychology of mass entertainment. The first speaker, Mr. D. W. Harding, discussed the desire for entertainment. A questionnaire yielded information on the psychological conditions in which the desire is most strongly felt. These fall into three different classes: (a) fatigue after work, the emotional state not being especially noticeable; (b) unpleasant emotional states (boredom, depression, irritation, strain, etc.); and (c) states of elation, cheerfulness, energy, and euphoria generally. A feature common to the entertainment demanded in all three states is that it should offer an immediate and direct reward for the effort that it requires. This is its unfailing contrast with almost all modern work. The view that entertainment is a form of escape appears to have only a very limited validity.

The second speaker, Mr. F. C. Thomas, considered the basic mental mechanisms concerned in mass entertainment. In the main the speaker devoted his attention to the types of organized and commercialized amusement typical of the amusement park or pleasure beach, of which Blackpool has so outstanding an example. It was shown how mass entertainment was a means of giving expression to certain of the innate propensities described by McDougall, e. g., the fear-escape propensity. The individual is placed in a situation which, if it occurred in real life, would be fraught with extreme danger, but which, in the amusement park, offers also an infallible means of escape. Fear may also be linked with the exploration-curiosity propensity, or with sex. Other sex manifestations of a somewhat subtle character were discussed. Most of the innate propensities were expressed on the pleasure beach either on the normal level, or on the slightly pathological level, as regressions, fixations, compensations, displacements, etc. The speaker suggested that many of the activities described must be regarded as infantilisms in the sense of being on all fours with typical children's play activities. The personal and social value of such types of amusement were emphasized. In so far as people tend to lead monotonous and unexciting lives, it is of value to them to have innocent means of compensation available.

The third speaker, Mr. F. A. Farley, considered the psychological types to whom mass entertainment appears. It was held that mass

entertainment must look to those of extrovert tendency for its patrons, and it will also encourage the extrovert tendency. It was suggested that during adolescence the previously prevailing tendency undergoes modification, and extreme extroversion or introversion may then be corrected. It was therefore desirable to provide mass entertainment which would further this desirable process.

Mr. W. F. Tyler read a paper on a means for the comparison of hot climates. Our sensation reactions to climatic conditions in hot countries cannot be ascertained from meteorological tabulations alone. What is needed for the comparison of reactions at various places is a sensation scale of degrees of climatic discomfort correlated to meteorological factors. An investigation at Shanghai by the writer in 1904 produced such a scale within the limits of humidity from saturation to 60 per cent. It is considered that the total sensation reaction to tropical and subtropical climates is made up of two parts: one, which can be named physical, tends to be marked by such physical signs as varying degrees of perspiration; the other is a neural reaction ranging from lethargy in humid conditions, through varying degrees of exhilaration in modern humidity, to excitement and irritability in arid conditions. The writer's idea was that for various places a mean of daily temperatures and humidities at, say, noon be obtained, that these be converted to degrees of physical and neural reaction by his method, and that the results be plotted in diagram form for the purpose of comparison.

A paper by Dr. R. W. Pickford was entitled "Conclusions of a Study of Group Psychology." An attempt was made to study the history of painting from the points of view of the biology and psychology of groups. Such points as the transmission of culture by group contacts, borrowing, and grafting were discussed, and it was found that the changes which take place in advanced cultures occur in much the same way as they do in primitive cultures. Mr. C. A. Oakley gave a paper dealing with some of the psychological problems of a depressed area. Fundamental in the attitude of the unemployed workers of today is irritation at being thwarted in their accustomed forms of creative expression and of general living. During their first period of unemployment, they are also in a state of fear, but apathy often follows. Their affectional relationships are undermined. The school work of their children deteriorates.

Professor R. Ruggles Gates read a paper on blood groups in Section H (Anthropology). The O-blood groups appears to be the

primitive condition from which A and afterwards B began to appear as mutations. That A is older is shown by its high frequency in Australian aborigines, pre-Dravidians of India, Bushmen, Lapps, and Hawaiians. B began to appear later in East and South Asia and in Africa. The fact that American Indians and Eskimos of pure blood are nearly all O has been difficult to explain, but peoples of similar physique, such as the Tso of Formosa and the Tungus, have a high percentage of O and may represent an ancestral type. The few Tibetans tested are, on the other hand, very high in B.

PSYCHO-ANALYSIS AND HORMIC PSYCHOLOGY

J. C. FLUGEL
University of London

Schools of psychology have, in all probability, existed since the time when man first became curious about the workings of his own mind. Certainly there are indications of their existence in all the known records of this curiosity. And with equal certainty we may assert that future historians will regard the first third of the twentieth century as a period characterized by an immense proliferation of such schools. Their presence testifies to a very welcome activity on the part of students of human and animal behavior; at the same time, by their diversity of outlook, terminology and method, they darken counsel, produce a very natural distrust and bewilderment in the plain man, and prevent psychologists themselves from speaking with authority or combining in effective collaboration on almost any subject whatsoever, however much the chaos of human affairs cries out for their assistance. Of recent years, however, there have at last been signs of a desire to bridge the chasms that separate these schools, and it may well be that a tendency to synthesis and consolidation will be as characteristic of the next few decades as sturdy pioneering individualism has been of those that are just past.

Such efforts at *rapprochement* have perhaps most chances of success when the schools of thought in question have at least some fundamental principles and interests in common, as in the case of the psychologies associated with the names of McDougall and of Freud, both of whom have insisted on the purposive or striving character of all mental activity and both of whom have shown an interest in the social applications of psychology. The fact that McDougall has devoted his latest volume[1] to a detailed criticism of certain aspects of psycho-analysis may therefore be looked upon as a sign of

[1] *Psycho-Analysis and Social Psychology* (London, 1936).

the times, a sign that psychologists are beginning to feel the need of understanding one another—even though, in so doing, they may manifest some very natural measure of impatience, intolerance or lack of insight, when faced with what sometimes seem to them the absurd and preposterous doctrines of their opponents.

The book in question represents three lectures delivered at University College, London, in the summer of 1935, together with five appendices, four of which are reprints of previously published articles. In the first lecture the author states the reason for his choice of subject, which is a critical examination of psycho-analysis in its relations to social psychology. Social psychology, he holds, is the best testing field for psychological theories. When and if they turn to social problems, exponents of nearly all the recognized schools and systems of psychology, from Wundt onwards, abandon their special theories and write in terms of "the psychology of common sense and common speech." Psycho-analysis and the other "psychologies that derive from Freud" have alone "proved immediately applicable to a great variety of social problems and that without undergoing any miraculous transformation of principles or of terminology." This implies some real virtues in the psycho-analytic outlook, and yet, in the author's opinion, the important truths contained in Freud's teaching are "mixed almost inextricably with error: or embedded in masses of obscure implications and highly questionable and misleading propositions." Indeed nearly all Freud's statements of fact, it is suggested, are made in terms that imply unacceptable theories. It is to the examination of some of these errors and obscurities that the rest of the book is devoted.

There is surely much justification for McDougall's general position. It is becoming increasingly difficult for even the most determined opponent of Freud to deny that he has thrown real light upon the behavior of human beings in social situations (much more light indeed than has been afforded up to now by all the other schools together). On the other hand it should be clear even to the most enthusiastic Freudian that psycho-analytic theory is extremely muddled and difficult to understand. Now McDougall's own system has also shown itself capable of application to social psychology; indeed, it has from the first been primarily directed to this end; and if it has proved less apt than Freud's for unravelling the complexities of human conduct, it is undoubtedly much clearer and better co-ordinated. A marriage of Freud's subtlety and profundity of

insight with McDougall's clarity and power of integration, if it could be achieved, would augur well for the further progress of the science of human nature and the social sciences that are, or should be, based upon it. It is to be hoped, therefore, that McDougall's present criticism, which we are told, is "ruthless" but "entirely friendly," will be given serious consideration by psycho-analysts themselves and by other students of the mind who are anxious to see a single science of psychology replace the bewildering "psychologies" of the present day.

Psycho-analytic theory has admittedly undergone very considerable changes at the hand of the master himself and some of its developments are interestingly shown by McDougall with the help of frequent reference to Freud's own statements. At the same time it is pointed out that the present theoretical position is still very far from being clear or consistent. Perhaps the most interesting and convincing part of McDougall's critical survey is that in which he endeavors to show that Freud is gradually approximating to McDougall's own position in recognizing such independent instincts as aggression, fear, and tenderness. McDougall's chief complaint against Freud is indeed the immense rôle allotted to the libido or sexual instinct, a concept which, according to McDougall, is responsible for innumerable pseudo-problems. Many of the criticisms here put forward are convincing; there *are* tremendous tangles in the theoretical considerations brought forward both by Freud himself and by his followers. And yet, as it seems to the present writer, it is through these tangles and through the possibly exaggerated or one-sided views that have produced them that progress has been made. Just as the behavioristic approach, with its paradoxical refusal to take any account of consciousness at all, produced the undoubtedly valuable method and concept of the conditioned reflex, with the wealth of data we have gained thereby in the sphere of animal psychology, just as the Gestalt school has drawn attention to the active forces continually at work in producing organization in the world as we perceive it, forces which may have been deducible from, say, Stout's psychology but which were not actually deduced (or, if deduced, insufficiently emphasized), so also psycho-analysis, with its *relative* over-emphasis on sex, has revealed sexual constituents in behavior which had been almost totally overlooked or neglected before. Similarly, with the help of such concepts as over-determination, condensation, sublimation, rationalization, it has shown that the motives of human conduct

are often more complex than had been imagined by earlier psychologists. The danger of a clear-cut and common-sense list of instincts such as that of McDougall is that it so panders to our intellectual laziness and desire for rationalization that we are often liable to overlook these complexities. Thus it remains a fact that Freud's conceptions of sex and of the polymorphous perversity of children, however much they may need limitation and correction, are the only ones which do justice to the richness of human sexuality either in early life or in maturity (though it remains something of a scandal, as McDougall hints in one place, that the biological aspects of the problems thus raised have not been followed up by observations on animals: Zuckerman's work on apes and monkeys shows what a rich field for research lies in this direction). Similarly, although the instincts of sex and fear were both well recognized by pre-analytic psychologists, it was Freud who first recognized the intimate and peculiar relationship between sex desire and neurotic anxiety. He thereby greatly complicated the problem of fear, though there can be no doubt that he enriched our knowledge (pp. 68 ff.). Once again, the symposiasts in a recent discussion on "Property and Possessiveness,"[2] are surely right in their insistence on the diversity and complexity of the motives at work in this sphere. It may be, as McDougall maintains (pp. 45 ff.), that no serious-minded psychologist would maintain that all the phenomena concerned could be explained by reference to a single "acquisitive" instinct; but it was Freud, and Freud only, who first threw light upon some of the less obvious but none the less important factors in acquisitive behavior. To give one more example of these crucial matters of sex and complexity, McDougall accuses the present writer of gross illogicality in saying,[3] first, that sex is in some respects hostile to the formation of social sentiments and then going on to maintain that freedom from certain forms or degrees of sexual inhibition is essential for the full development of some important forms of social feeling. I must perhaps plead guilty to having laid myself open to misunderstanding by starting out, in the essay under consideration, from an exclusive treatment of the opposition between sex and sociality and then allowing myself, as it were, to discover their co-operation. But the truth here is, as McDougall will assuredly agree, that both opposition and co-operation occur (as, for instance, also in the case of the relation of

[2] *Brit. J. of Med. Psychol.*, 1935, XV, 51. The reference is wrongly given on p. 44 of McDougall's book.

[3] In *Men and Their Motives* (1934), pp. 44 ff.

sex with fear and curiosity); the problem is to determine what are the conditions which give rise to one or the other form of interaction, and it was as a small contribution in this direction that my essay was intended.

It may well be that, as McDougall maintains (p. 29), much psycho-analytic description is vitiated by the argument which, explicated, runs: the sex-impulse is unmistakably at work in a certain proportion of social activities, therefore all social activities are wholly sexual. Freud's own comparatively recent differentiation of the aggressive instinct and his tendency towards the recognition of other independent instincts are strong evidence in support of this view. But it looks as though, here as elsewhere in psychology (as perhaps to some extent in every science, for the "law of span" holds good of all human thought), a new vision can only be obtained by concentrating on certain novel aspects of a problem, to the neglect of many other aspects that are relevant. Correction for these errors of neglect is in turn essential, and McDougall's book undoubtedly provides useful material for such correction in the case of psycho-analysis.

In the process of correction, however, we must beware of throwing out the baby with the bath; and to the present writer it seems that McDougall, in spite of his expressed admiration for many of Freud's discoveries, is in danger of doing this. To take one example, it is perfectly true that the Pleasure Principle, as usually expounded, is open to all the objections that can be raised against psychological hedonism. But the distinction between the Pleasure Principle and the Reality Principle (however unsuitable these names may be) seems nevertheless to be a valuable one; one, too, that is quite capable of being restated in hormic terms, and, as thus restated, perfectly compatible with McDougall's own psychology; it is just the distinction between satisfaction with, and without, reference to reality (and as psychologists we can go far without getting involved in metaphysical problems as to the ultimate nature of "reality"). Although McDougall, like all other writers of psychological text books, has been concerned in his time with the distinction between imagination and perception, his indignation over the misuse of the Pleasure and Reality Principles has made him oblivious of their value and indeed, as I think, of their essential meaning. Thus the whole point of Freud's and Forsyth's attacks on religion has been missed. Though no doubt both science and religion spring ultimately from instinctual

needs, there is surely all the difference in the world between the satisfaction of these needs with and without what Freud has called "reality-testing."

Similarly McDougall's disapproval of "anthropomorphic" concepts such as the Censor, the Ego, the Id, and the Super-Ego, while on the one hand it has helped him to see their dangers and obscurities, has apparently led him to overlook certain similarities to his own doctrine. He points out clearly the difficulties and uncertainties of the Freudian doctrine of repression, shows how Freud has been reluctantly compelled to give up the idea that one instinct (or set of instincts) acts always as repressor, while another always plays the part of the repressed; he reveals the utter uncertainty of present Freudian theory in regard to the relations between the Id, Ego, and Super-Ego; he shows the changes in the interpretation of the Œdipus Complex that have been made by various writers at various times; but he nevertheless fails to draw attention to what are surely the striking resemblances between the Super-Ego and his own "sentiment of self-regard"; nor does he refer to the elaborate discussion as to the relations between "sentiments" and "complexes" which appeared in the *British Journal of Psychology*[4] a good many years ago. He likewise fails to draw attention to the fact that the process of Displacement, which plays so large a part in the psycho-analytic theory of mental development, is implied also in his own views of instinctual behavior and of the formation of sentiments.

We are of course accustomed to objections to Freud on moral or aesthetic grounds. McDougall is frank enough to admit freely that such feelings play a part in his own attitude. Such admissions appear from time to time throughout the book, as when he talks of the common assumption among Freudians that "any wild hypothesis is likely to be true if only it is sufficiently nasty." Now I am inclined to think that a case could indeed be made out for the view that many psycho-analysts have expounded their doctrine in a way and with a terminology that unnecessarily offends common sensibilities; whether this be in sexual matters (as with the above-mentioned "polymorphous perversity" of children), or in others that seem to reflect Freud's own pessimistic outlook (such as his concept of the Death Instinct, which McDougall calls "the most bizarre monster of all his gallery of monsters"). Perhaps this is only the affective counterpart of that intellectual narrowness of outlook which seems

[4] 1922, XIII, 107 ff.

almost inevitably to characterize presentday schools of psychology—an attitude comparable to that which inspired J. B. Watson to say that he found himself scarcely able to attach any meaning to "consciousness." But if Freud, like Watson, has committed outrage on our feelings, the former has surely made amends in his doctrine of sublimation (which McDougall accepts) and in his statement to the effect that psycho-analysis has shown us to be "not only far more immoral than we thought, but also far more moral than we had any idea of." This, however, does not satisfy McDougall, who in a last appendix, based largely, it would appear, on the views of Dr. W. H. Sheldon, complains of the social effects of Freudian teachings in disturbing the relations between parents and children (through "silly and credulous horror of the Œdipus complex"—the words are Dr. Sheldon's) and in leading to "the emergence of the waster mind to dominance in our civilisation" (a dominance which, we are told, p. 197, produced the American economic boom and slump of 1929 as one of its most striking and unmistakable manifestations). Freud's teaching, as popularly interpreted, leads, it is maintained, to the view that all restraint is bad—particularly so in the sexual sphere. McDougall has the grace to admit that such practical corollaries are largely based on misunderstandings (misunderstandings, he might have added, comparable to those made in certain rash applications of Darwinian concepts to the political sphere); and he evidently hopes that modification in the views of psycho-analysts in regard to the importance of the Œdipus Complex and the rôle of the sexual instinct will remove these evils. He mentions no compensating social effects of a beneficial kind; so we are left with the impression that the social effects of psycho-analysis up to the present have been wholly evil. But from what he says at the beginning of the book (and has said elsewhere) as to the practical importance of social psychology and the successes won by Freud and his followers in this sphere, it is fair to assume that he is evidently much less pessimistic as to ultimate results. We, in our turn, can only hope that he is entirely right with reference to the future and unnecessarily gloomy in regard to the present.

If psycho-analysis has, presumably through the soundness of its fundamental concepts and the correctness of its diagnosis, thrown some real light upon the social behavior of mankind, it would be an amazing perversity indeed if its influence were felt only in ways that are practically harmful. McDougall, approaching the problems

from a conservative standpoint, is inclined to see psycho-analysis as a disruptive force. Left wing moralists and politicians, on the other hand, have of late years been complaining of the reactionary tendencies of psycho-analytic doctrine. Meanwhile Freudians themselves, with very few exceptions, have displayed a cautious reticence. Whatever may be the direction in which psycho-analysis may ultimately lead us, it cannot truly be said that the members of this school as a whole have been over hasty in proposing widespread social applications of findings, which, however unwelcome or suggestive, have admittedly revealed more problems than they have unravelled.

NEWS AND NOTES

Great Britain

Child Guidance: The New Education Fellowship Conference

The Seventh World Conference of the N. E. F. was held at Cheltenham from July 31 to August 13, 1936; it attracted nearly two thousand members from some fifty countries. One of the main topics of lectures and discussions was child guidance and its place in education. Dr. D. R. MacCalman, of the British Child Guidance Council, mentioned the remarkable growth of the movement in England during the last ten years. There are now over fifty clinics which have developed either independently, or in connection with hospitals, training colleges or university psychological departments. Perhaps the best arrangement, recently adopted at Birmingham and Bristol, is the establishment of clinics by local education authorities, so that they become part of the school system. Drs. N. Tibout (Holland), H. Omar (Egypt), and L. Goldscheider (Poland) described the progress of child guidance in their own countries. Members of the Conference were much impressed by the widespread and enlightened applications of psychology to education in Poland; and, at an exhibition of children's drawings, paintings, and handwork held coincidently with the Conference, many considered that the Polish productions were of outstanding merit.

A report of the Conference proceedings will be published next January. Here it is possible only to summarize a few of the main points from the papers of doctors, psychologists, and social workers engaged in child guidance. The diagnosis and treatment of nervous or difficult children generally involves several lines of attack—economic, medical, environmental, emotional, and intellectual. None of these can safely be left out of account. (For example, it emerged in a discussion that emotional therapy might be useless with many children in a depressed area who are chronically undernourished.) Some clinics, however, tend to lay most stress on the emotional situation in the child himself, while others concentrate more on his social environment. The former attitude is perhaps commoner among psychoanalysts.

The psychoanalytic approach to child guidance was represented by such authorities as Drs. Melanie Klein, Susan Isaacs, Margaret Lowenfeld, and J. Hadfield. Though Mrs. Klein did not consider analysis to be essential for all problem children, yet she stated that in some cases any simpler procedure may be merely a waste of time and money. Children's difficulties may arise mainly from an unsuitable environment in their early years, or they may be due to internal conflicts between the impulses of love and aggression; and it is in these latter cases that analysis is most needed, since alterations of environment will have no effect. Mrs. Isaacs also emphasized intra-psychic conflict as the basis of subsequent deviations of character, and showed the ill-effects of too great dependence or of repressed hate, in the young child's emotional attitudes to *both* parents. Dr. Lowenfeld pointed out that the child's conceptions and attitudes often

appear extremely fantastic to the adult mind. Though quite logical in their development, they may be founded on distorted premises, and only by discovering the real nature of these conceptions can the child's difficulties be removed. Unfortunately the child's language is often quite inadequate for conveying his ideas, hence the importance of play techniques in diagnosis and therapy. Play does not merely mean amusement; rather it is the medium through which the child expresses his natural self, so long as adults do not interfere. Dr. Lowenfeld described some of the types of play which have been found, at the Institute of Child Psychology, to be most valuable for revealing what is going on in the child's mind.

One of the commonest misconceptions about psychoanalysis is that it advocates complete freedom for the expression of children's impulses. Some "modern" schools, which set out to avoid all restraints and inhibitions, do indeed claim psychological justification for their methods. But as Dr. J. Hadfield pointed out, uncontrolled instincts lead to quite as much bondage of personality as do over-severe restrictions. Bodily health would not be improved if all the bodily organs had freedom to function independently; similarly mental health depends on the organization and coördination of impulses towards some common end. Dr. F. Redl (Vienna) also dealt with this topic. He distinguished broadly between the forces of instinct, reason, and conscience (id, ego, and super-ego) and showed that the well-adjusted personality is one in which these forces are adequately balanced.

Turning to those who lay more stress on environmental factors in guidance, and in particular to the functions of the school, Dr. R. H. Barbour pointed out, first, that teachers have a unique opportunity for noticing children's problems as they arise; they are of course much more easy to deal with in these early stages. Even when the problems center mainly around the home situation, they are likely to find expression also in school. For teachers, according to Dr. C. L. C. Burns, are very apt to become unwitting parent substitutes; the child projects onto them his emotional attitude towards his parents. Secondly, teachers can give invaluable help not only in remedial coaching of retarded children, but also in emotional therapy. And thirdly, they should act as intermediaries between the clinic and the parents, who are naturally suspicious of psychological treatment. Their co-operation is essential in the majority of cases, and teachers can interpret to them the work of the clinic. In an interesting paper on the social worker's job, Miss N. K. Hunnybun mentioned how often parents fail to realize that a strained home situation has anything to do with their children's delinquencies or with backwardness at school.

Clinics, however, are only able to deal with a small proportion of the children who need guidance; and Dr. H. E. Field showed that the teachers themselves are forced to look after the majority of everyday problems—bullying, rowdiness, timidity, laziness, educational disabilities, etc. They cannot, and should not try to become expert psychometrists and clinicians, but they should be trained to recognize those cases where the specialized techniques of the clinic are essential. At present they are too prone to identify good emotional adjustment with good classroom behavior.

Several speakers dealt with the psychometric aspect of child guidance. Miss C. Simmins advocated educational guidance, by means of intelligence and specialized ability

tests, at about eight years, so that the type and extent of work for which children are most fitted can be planned. In this way the strain of examinations at ten to eleven years might be greatly reduced in its incidence. A considerable proportion of adolescents and adults who attend clinics manifest the bad effects of examinations, which, as Sir Philip Hartog and Dr. R. B. Cattell showed, are extremely inefficient methods of assessing abilities. Dr. A. Smits-Jenart (Belgium) described a new group test of intelligence—the D. B. Test—which is applicable between four and seven years. The test material is entirely pictorial or diagrammatic, and the instructions will be translated shortly. If the reliability and validity of the test are substantiated, it should make possible homogeneous grouping of classes according to ability *before* the age at which formal teaching of the three R's begins.

Dr. M. Creak summarized some of the main facts with regard to reading disabilities—their greater incidence among English-speaking children than in France or Germany; the marked sex difference in frequency; the relationship, still not fully understood, to motor disturbances such as poor rhythmic sense, left-handedness, etc.; and the extremely important part which the child's emotional attitude, and his personal relationship with the teacher, play in remedial coaching.

Dr. C. Ryan (U. S. A.), describing certain advances in educational measurement, issued a warning against teachers becoming "test mad," and Dr. P. E. Vernon drew attention to the dangers of regarding the I. Q. as a fixed and definite measure of the child's innate intelligence. It is, of course, somewhat unreliable; it varies with the particular version of the Binet test, or the particular group test, used; and it is to some extent affected by the child's cultural background. Dr. H. Wallon (Paris) contributed a survey of the various methods of measuring character and personality—tests of conduct, of moral judgment, emotional attitude questionnaires, free association, etc. He was doubtful of their immediate applicability in child guidance. Mr. T. A. Rodger outlined the methods of assessing interests and personality traits which have been worked out at the National Institute of Industrial Psychology. Just as the study of abnormal children has thrown light on normal personality development, so the study of vocational failures reveals the main traits that are of importance as a basis for vocational advice. Although it is possible to test such traits fairly adequately nowadays, yet the tests would take up far more time than the vocational psychologist can afford. Moreover, they would only give a cross-sectional picture of the testee, whereas the psychologist, who has to predict for the future, should try to find out how they have developed in the past. Hence his preference for the case-history method, based on information from parents and teachers and on a systematic interview with the testee.

P. E. VERNON.

London.

U. S. A.

The Possibilities of Graphology

What appears to be the first conference on graphology in this country took place in Cambridge, July 23, 1936. It was in the form of a round-table discussion among several psychologists, including Prof. William Stern, formerly of the University of Hamburg and now at Duke, Prof. Gordon W. Allport, of Harvard, and two graphologists, Mrs. Thea Stein-Lewinson and Mr. Henry A. Rand.

Among those who participated in the discussion were: Prof. Lundholm, of Duke University; Prof. McLaughlin, of the Harvard Law School; and Dean Lord, of Boston University.

The meeting, presided over by Dr. A. A. Roback, was planned originally as a final session of the small class in experimental graphology which he has conducted this year. It is believed that the critical discussion which developed warrants report.

The attitudes which were expressed ranged from radical disbelief in graphology as a psychodiagnostic index of any value to the conviction that handwriting manifests the personality more clearly than all other means in combination.

Prof. Stern expressed a genuine interest in the possibility of developing graphology as a psychodiagnostic measure. He warned against accepting it as a panacea, pointing out that quackery in medicine arises from cutting down diagnosis and treatment to a single formula—the monosymptomatic method. A good physician is elastic and comprehensive. Similarly, analysis of handwriting would be significant only when compared and combined with other approaches to personality. In some cases it might be very valuable in revealing the potentialities of an individual; in others it might be worthless. Thus, pure graphology is just as bad as any other single diagnostic measure. No single test may be considered valid without corroboration. As scientific psychologists, we must demand that personality diagnosis presuppose a knowledge of all the methods available, to determine which are indicated for a given individual. Graphologists see only one index. How can they judge whether the handwriting of X is the most symptomatic index of his personality? Prof. Stern admitted that graphology can be a valuable aid to psychologists. In the last ten years opposition in Germany has decreased considerably, he said. Graphology is concerned with movements, and movements are always expressive. We can suppress some forms of expressive movement by volition, but it is not possible to suppress them all. Prof. Stern claimed that other movements, as the gait or the voice, for example, express personality perhaps just as well as handwriting and that the latter has been singularly developed only because it is so available for study.

Mrs. Lewinson, who has studied the interpretation of handwriting in Germany, and Mr. Rand agreed with much that Prof. Stern said, and granted that the claims of some graphologists were extravagant. An individual may conceal his personality in some parts of his writing, but to conceal it entirely is impossible, Mrs. Lewinson asserted. The degree of originality which a person possesses is proportional to the deviation from the specific method of writing learned. Thus, handwriting always reveals this quality unless the vocation of the person is such as to fix his writing to a definite form, as in the case of a bookkeeper or school teacher. The style of script which was learned is an all-important consideration. For example, the Palmer method teaches the writer not to use much pressure. Therefore, evidence of heavy pressure in this school is important as an indication of forceful character. In Germany, where pressure is taught, it is not so significant. When factors such as these are taken into consideration, as is being done to a greater extent all the time, graphology may be considered to operate on a scientific basis, which is necessary in obtaining valid information about an individual's personality.

Prof. Allport upheld Prof. Stern's remarks and stated his own views as to the value and limitations of graph-

ology. His main objection was that there are certain aspects of personality not at all accessible to study through handwriting. Some traits are more easily revealed than others. He divided the material into four classes of accessibility. Most clearly indicated in writing are the traits intimately related to the motor sphere, such as speed, impulsiveness, and degree of deterioration. In the second class are deep-lying traits such as aesthetic interests and in the third class (not easily accessible) lie qualities of "character" such as honesty. These traits are not easily determined because they are so confused by social evaluation. There is, for example, no such psychological fact as "criminality."

The fourth class represents *content* as opposed to *form* in the personality, and Prof. Allport considers this class quite beyond graphology. A person may be idealistic, but it is the content or object of his idealism which is important and inaccessible. For example, is the idealism theosophical, catholic, or communistic? Paradoxical as it may seem, said Dr. Allport, handwriting is probably more complicated than personality. Dr. Allport believes that the a priori case for graphology is excellent, and that the field is certainly worthy of research.

This co-operation between psychologists and graphologists should serve as an example and hopeful indication that this subject is beginning to get the attention which it deserves as a possibility in psychodiagnostics. We cannot afford to disregard any method of analyzing the personality until it has definitely proven valueless, or until another method has proven adequate in every respect.

WILLIAM F. GERBER.
Harvard University.

BOOK REVIEWS

THE PSYCHOLOGY OF BELIEF. By Helge Lundholm. Durham, N. C.: Duke University Press, 1936. Pp. 245. $3.00.

Dr. Helge Lundholm presents an interesting phenomenon. During the last few years, when the predominant tendency among his American colleagues has been to fall back baffled from all theorizing, discouraged by the manifest bankruptcy of Behaviorism, of Connectionism, of conditioned reflexes, of S-R bonds and of other such magic formulas and short-cuts to understanding and explanation, and to decline and recline upon a strictly 'factual' psychology, Lundholm has produced a long series of articles, monographs, and books, all largely concerned with theoretical problems. According to taste his activity may be described as a riot of speculation, or as the origination of a wealth of stimulating, suggestive hypotheses, hypotheses which may well perform a much-needed service in breaking a way through the rapidly growing mass of 'facts' which threatens our science with stagnation and fatty degeneration. For Lundholm, not content with dragging into the light various neglected problems and with devising a consistent system of hypotheses for solving them, applies and pushes his hypotheses ruthlessly, almost ferociously, showing a well-nigh indecent indifference to the fleeting fashions which come and go so swiftly in the American field, a naïve confidence in the principle that the proper and only way to test hypotheses is to apply them to unsolved problems, and an equally naïve hope that his hypotheses, if they can stand up to such testing, may attain to general acceptance or, at least, obtain a hearing.

Lundholm's meteoric outburst as a theoretical psychologist is partly explained by his history. During his student days in Europe, in his native land, Sweden, in Paris and under the late Alfred Lehmann at Copenhagen, he imbibed the current academic psychology of Lehmann, Wundt and Janet, with its markedly atomistic and intellectualistic bias. After some years of research into industrial problems on behalf of the Swedish government, fate brought him to America and made him during some ten years psychological research officer of the McLean Mental Hospital in Massachusetts. There he found the sensationist quasi-mechanistic psychology with which he had been equipped singularly sterile as an aid to the understanding of the mind diseased. While still holding this office, another turn of fate brought him into contact with a psychology of a very different type, the conational psychology of G. F. Stout and Samuel Alexander. The subtle penetration of these authors and the explanatory power of their psychology delighted him; and he seemed to find in the hormic principles expounded by McDougall a firm biological foundation for that psychology. He began eagerly to apply it, with the aid of experiment, to the urgent problems that lay all about him in the mental hospital; and produced a series of very original and stimulating articles embodying new interpretations of most of the leading phenomena of the functional disorders, chief among

them being his two monographs on the manic-depressive and schizophrenic disorders.

More recently, working in the more expansive atmosphere of a university, he has pushed on to grapple vigorously along the same lines with some of the most fundamental problems of all psychology, most notably in his *Conation and Our Conscious Life* and in the present volume.

Belief is a problem, or rather a series of problems, so recondite that few psychologists have come within sight of them, and so difficult that fewer still have made any attempt to grapple with them, beyond repeating, perhaps, the inept formula of David Hume and the associationists which identifies belief with inseparable association. Lundholm examines the contributions of James, Stout, and McDougall and, accepting these as his taking-off ground, seeks much more fundamental interpretations in terms of the hormic principles so thoroughly developed in his *Conation and Our Conscious Life*. Since any criticism of his conclusions would require examination of the whole system of conational and hormic psychology which he here applies to this very special group of problems, I must be content merely to draw attention to this very noteworthy contribution to one of the obscurest and most important of all psychological problems; most important because the psychology of belief is the indispensable key to all the psychology of intellection.

It must suffice to say very briefly that Lundholm accepts McDougall's tripartite definition of the problems of belief: (1) the problem of the genesis of belief; (2) the nature of belief as a mode of experience; (3) the nature of 'a belief' conceived as an enduring disposition. There is, however, a fourth great problem which McDougall had failed to distinguish from those other three, namely, the problem of the seeming conative power of belief, the power of 'a belief' to guide conduct, the directive power which distinguishes belief from mere apprehension or representation, makes 'a belief' something more than an 'idea', a 'concept', or a 'thought'. And Lundholm should have defined this fourth problem as one distinct from the other three; for, though he has much of interest to say on the other three heads, it is this fourth problem which he is chiefly concerned to solve. His proposed solution of the problem of the guiding power of belief is a most intriguing and original contribution to psychological theory.

The new theory is developed from McDougall's theory of suggestion and his theory of the sentiments. Accepting those theories, Lundholm widens their basis, elaborates them in detail, and, by so doing, evolves in outline a complete theory of belief, its genesis, its nature as experience and as disposition, and its functioning as guide of all behavior above the simplest instinctive level.

At first sight one may incline to think that Lundholm's interpretations of various familiar functions (such as perception of physical objects) are too complex and elaborate. Yet that would be unfair. Undoubtedly, our mental processes are very complex and require very complex interpretations. It is rather the very simple interpretations which should *prima facie* incur a justified suspicion.

Lundholm manifests here, as in his earlier publications, two outstanding qualities which are as rare as they are essential for the advancement of psychological theory: first, the power of seeing problems which hitherto have lain unseen under our noses and which remain invisible to many of us even when they have been clearly indicated; secondly, the courage to

press home his attack on them consistently in terms of the fundamental theory adopted and of the more special hypotheses formulated for the application of the theory to the more special aspects of the main problem with which he is concerned.

W. McD.

ZUM PROBLEM DER AUSSERSINNLICHEN WAHRNEHMUNG. By Hans Bender. Leipzig: Johann Ambrosius Barth, 1936. Pp. xi, 116.

This study bears the subtitle, "A Contribution to the Investigation of 'Clairvoyance' by Laboratory Methods." The research was done in the Psychological Institute of the University of Bonn, Germany.

Dr. Bender began this research on the strength of a spontaneous observation. He had been investigating automatisms by the use of a planchette. Some of his subjects reported that they sometimes did not need to look at the board to find the letters. This claim seemed so important that the work with the planchette was discontinued for a time to investigate it with a single subject, Miss D., a student in philosophy.

The primary aim of the investigation was to find out whether extra-sensory perception occurred. To do this, steps were taken to safeguard against sense perception in the tests used and to show that the subject's success was nevertheless more than could be attributed to random guessing. If clairvoyance were established, a second aim of the investigation was to relate it to some modes of sense perception. To this end, the development of the extra-sensory image was compared with the development of images at the threshold of vision with increasing illumination. These aims were pursued in this order, and the results may better be so reviewed.

The tests for clairvoyance were made with a set of twenty-seven cards, containing the letters of the alphabet and a dot, prepared by an assistant. The work was carried out in four series of a few days each, extending from May, 1933, to November, 1934. The procedure was changed from time to time, usually with a view to increasing the safeguards against sense perception. In all, 134 trials at naming a randomly selected, concealed card are reported.

The subject had more than five times as many outright successes as would happen, on the average, by chance.

The results are presented in chronological order. Each of the four periods of experimentation is reported as a distinct series. Series I, yielding seven outright successes in thirty-four trials, is important chiefly because it encouraged the investigator to continue with better conditions.

In Series II, the cards were covered with two folds of cellophane, stapled by a machine three times at the top of the card and twice at the bottom. The symbols were made with luminous paint, crayon, or ink, and it was found that the subject succeeded equally well with each class. The cards were placed in numbered, unsealed envelopes by a colleague and were changed about by him from day to day. During the experiments, the subject reclined with a heavy black cloth spread over her body up to her neck. The subject was told to try to "perceive" each card under any or all of three conditions of presenting the stimuli, in the order of their description here. (I) The experimenter chose an envelope at random and placed it in a little wooden box, with the card face up, seventy centimeters from the subject and out of her sight and reach. (II) The experimenter placed the envelope containing the card seventy centi-

meters away from the subject, where she could see, but not touch it. (III) The envelope was presented under the cloth cover to the hands of the subject without her seeing it. The subject was, under this condition, free to remove the card from the envelope and handle it, returning it to the envelope when the trial was complete. After each trial the experimenter returned the card to the others and shuffled them all. The results were verified only after each period of working.

The subject's responses took the form of verbal descriptions of impressions about the stimuli, which were taken down fully. These were often supplemented by drawings which the subject made. In order to provide an empirical check upon the results, the experimenter always drew a card from a duplicate set in the same manner as the experimental one and found how well the subject's responses fitted this by chance. Sixty-nine trials were made in Series II. According to the author's interpretation of the results, fifteen letters were absolutely right, twenty partly so, and sixteen undecided. Only eighteen cards were missed entirely. In the parallel chance series, only one trial was correct and seven partly so. From the results of Series II, independent proof of the occurrence of extra-sensory perception was claimed.

In the last two series, which included both witnessed work and presentation of some of the cards behind the subject, the successes were more frequent, rising to 50 per cent in Series IV. Close study of the tables shows, however, that the higher degree of success in these series came only under the old conditions, while the condition of presenting the cards behind the subject's back, untouched by the subject, yielded only chance results.

Statistical treatment of the data is conspicuous by its absence. Dr. Bender chooses—and goes to some length to justify his action—to give only totals and percentages without further quantitative treatment.

For many readers, the attempt to relate clairvoyance to facts of normal perception will be the most interteresting part of the study. In Series III, the subject was asked explicitly to make drawings of the phases of development of the clairvoyant images. These images passed through clearly marked stages, whether finally right or wrong. The same kind of material was then used for threshold vision tests with increasing illumination, and drawings of the development of the sensory images were made. These two "kinds" of images showed definite parallels in development.

Dr. Bender seems well aware that the proof of clairvoyance raises more problems than it answers. He frankly admits that no light has been thrown upon the primary mechanism involved in extra-sensory perception. The theoretical interpretations advanced are on the whole well reasoned but show a tendency to generalize too freely from the results of a single subject.

J. G. PRATT.

New York City.